PB80-900116

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GOVERNMENT REPORTS

Announcements & Index

16 August 1, 1980
U.S. Department of Commerce
National Technical
Information Service

NTIS

GOVERNMENT REPORTS

Announcements & Index

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U.S. DEPARTMENT OF COMMERCE Philip M. Klutznick, Secretary of Commerce
NATIONAL TECHNICAL INFORMATION SERVICE Melvin S. Day, Director

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GOVERNMENT REPORTS

Announcements & Index

Volume 80, Number 16 August 1, 1980

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* Committee on Scientific and Technical Information

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SAMPLE ENTRIES

MAIN ENTRY

Report entries are arranged by subject group and field. Within fields they are arranged alphanumerically by NTIS order number (accession number); alphabetic data precedes numeric.

Field 10 ENERGY CONVERSION (NON-PROPULSIVE)

Group 10A Conversion Techniques

Order number
Corporate author
Personal author
Price codes
Report title
Abstract of report

PB-254 315/5GA PC A16/MF A01
Smithsonian Science Information Exchange, Inc., Washington, D.C.
Information on International Research and Development Activities in the Field of Energy, David F. Hersey. May 76, 370p* NSF/RA-760057, Grant NSF-AER74-20678

This directory is the product of a data collection effort undertaken by the Smithsonian Science Information Exchange (SSIE) on behalf of an interagency committee formed under the U.S. State Department to provide international cooperation in energy research and development. Included is information covering 1766 ongoing and recently completed energy research projects conducted in Canada, Italy, the Federal Republic of Germany, France, the Netherlands, the United Kingdom, and 25 other countries. In addition to the title and text of project summaries, the directory contains the following indexes: Subject Index, Investigator Index, Performing Organization Index, and Supporting Organization Index.

INDEX ENTRIES

Index entries are arranged alphanumerically. Titles are included in all indexes except the Contract Number index.

SUBJECT

ENERGY
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by major subject term and by NTIS order number.

PERSONAL AUTHOR

HERSEY, DAVID F.
Information in International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by personal author, report title, and NTIS order number.

CORPORATE AUTHOR

SMITHSONIAN SCIENCE INFORMATION EXCHANGE, INC., WASHINGTON, D.C.
Information on International Research and Development Activities in the Field of Energy.
(NSF/RA-760057)
PB-254 315/5GI 10A

Entries are sequenced by corporate author name, original report number, and NTIS order number. The monitor agency number is given following the report title.

CONTRACT GRANT NUMBER

NSF-AER74-20678
Smithsonian Science Information Exchange, Inc., Washington, D.C.
PB-254 315/5GI 10A

Entries are sequenced by contract or grant number, corporate author, and NTIS order number.

ACCESSION/REPORT NUMBER

PB-254 315/5GI
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A PC A16/MF A01

Entries are sequenced by NTIS order, original report, or monitor agency number. Price codes are given in this index.

REPORTS ANNOUNCEMENTS

1. AERONAUTICS

1A. Aerodynamics

AD-A083 165/1 PC **A04/MF A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Influence of Wind Tunnel Noise on the Location of Boundary-Layer Transition on a Slender Cone at Mach Numbers from 0.2 to 5.5. Volume I. Experimental Methods and Summary of Results.
Final rept. 26 Jan 70-28 Apr 77,
N. Sam Dougherty, Jr. Mar 80, 53p Rept no. AEDC-TR-78-44-VOL-1
Prepared in cooperation with ARO, Inc., Tullahoma, TN. See also Volume 2, AD-A083 166.

A study was conducted to investigate the effects of wind tunnel noise on the location of boundary-layer transition. The study was carried out by conducting experiments on a particular slender, highly polished cone having an included angle of 10 deg. Wind tunnel noise levels were measured in the test section by flush-mounted microphones imbedded in the cone surface. The measurement of boundary-layer transition location was made using either a traversing pitot pressure probe in contact with the cone surface or the flush-mounted microphones. The experiments were carried out in 23 different subsonic, transonic, and supersonic wind tunnels over a range of Mach numbers from 0.2 to 5.5 and a unit Reynolds number range from 1.0 to 7.0 million per foot, the bulk of the data being obtained for a range from 2.0 to 4.0 million per foot. The results clearly show a strong influence of wind tunnel noise on boundary-layer transition location correlatable with overall root-mean-square noise levels. Because the noise level generally varied with Mach number and unit Reynolds number, the unit Reynolds number was found to have little effect on transition Reynolds number. (Author)

AD-A083 166/9 PC **A11/MF A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Influence of Wind Tunnel Noise on the Location of Boundary-Layer Transition on a Slender Cone at Mach Numbers from 0.2 to 5.5. Volume II. Tabulated and Plotted Data.
Final rept. 26 Jan 70-28 Apr 77,
N. Sam Dougherty, Jr. Mar 80, 250p Rept no. AEDC-TR-78-44-VOL-2
Prepared in cooperation with ARO, Inc., Tullahoma, TN. See also Volume 1, AD-A083 165.

A study was conducted to investigate the effects of wind tunnel test section noise on the location of boundary-layer transition. The study was carried out by conducting experiments on a slender, highly polished cone with an included angle of 10 deg. Wind tunnel test section noise was measured by microphones flush-mounted on the cone surface. In most of the experiments, boundary-layer transition was measured with a surface-mounted, traversing pitot pressure probe. The experiments were conducted in 23 different subsonic, transonic, and supersonic wind tunnels over a Mach number range from 0.2 to 5.5 and a unit Reynolds number range from 1.0 to 7.0 million per foot, the bulk of the data being obtained between 2.0 and 4.0 million per foot. The results show an influence of wind tunnel noise on boundary-layer transition for most of the wind tunnels. (Author)

AD-A083 242/8 PC **A03/MF A01**
Air Force Flight Dynamics Lab Wright-Patterson AFB OH
Research in Computational Aerodynamics.
Final rept. Jul 75-Sep 79,
W. L. Hankey. Feb 80, 38p Rept no. AFFDL-TR-79-3127

Experience obtained by the Computational Aerodynamics Group, WPAFB, in numerically solving viscous flow problems with the Navier-Stokes equations shall be addressed. Topics discussed include grid generation for arbitrary geometries, numerical instabilities, turbulence models, accuracy, efficiency, and smearing of discontinuities. Applications are reported for the method to solve shock wave-boundary layer interactions, 3D interactions, inlets and nozzle flow fields and unsteady viscous flows. (Author)

AD-A083 430/9 PC **A04/MF A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Turbulent Transport Phenomena (Les Phenomenes de Transport Turbulent).
Advisory rept.,
Marcel L. Barrere. Feb 80, 53p Rept no. AGARD-AR-150
Text in English and French.

In 1976, the Propulsion and Energetics Panel set up its Working Group 09 on 'Turbulent Transport Phenomena'. The objective was to improve knowledge of scalar fluctuation in turbulence with or without chemical reaction in variable density flows and to develop techniques for measurement of scalar fluctuations, especially static pressure. This report contains the results of the Working Group. After the description and the discussion of the temperature measurement methods (optically and using probes) the measurement methods of non constant concentration and density are treated. After regarding the possibilities of fluctuating pressure measurement some conclusions are drawn. This Advisory Report was prepared at the request of the Propulsion and Energetics Panel. (Author)

AD-A083 447/3 PC **A04/MF A01**
Naval Surface Weapons Center Silver Spring MD
An Integral Method and Its Application to Some Three-Dimensional Boundary-Layer Flows.
T. F. Zien. 18 Jul 79, 67p Rept no. NSWC/TR-79-139

The simple integral method developed and successfully employed by the author to provide accurate approximate solutions to a wide variety of problems in viscous boundary-layer flows and transient heat conduction with phase changes is further studied. A simple boundary value problem in ordinary differential equation is used as the model problem for the study. Different schemes of the method used in earlier applications are examined in some detail along with a new and potentially more accurate scheme. On the basis of the comparison between the approximate solutions and the exact solution, some remarks on the relative merits of the various schemes are made along with some observations on the judicious choice of the approximate profiles for use in the calculation. The method is then applied to yield approximate solutions of a class of relatively simple three-dimensional boundary-layer flows. Results are reported of boundary layers on a semi-infinite flat plate with parabolic and circular inviscid surface streamlines, and boundary layers over an infinite yawed wing. Results are presented in terms of skin-friction, and are all obtained in simple closed form. Comparisons with existing exact solutions are included to indicate the accuracy of the method. (Author)

N80-21284/8 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Investigations Regarding the Drag Characteristics of Flow-Disturbing Bodies Which Are Arranged in Line and Attached to the Wall.
M. Balkowski, and H. Schollmeyer. Mar 80, 15p NASA-TM-75788
Contract NASW-3198
Transl. Into English from Abhandlungen (Germany, F.R.), No. 21, Dec. 1974 p 20-24. Original Language Document Was Announced as A75-23097. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Rheinisch-Westfaelische Technische Hochschule, West Germany.

The flow characteristics of rectangular bodies mounted on the base area of a rectangular closed wind tunnel are investigated. As many as four bodies are mounted in line with equal distances between successive bodies. The Mach number of the flowing air is in the range from 0.1 to 0.5. Total and individual drag values could be charged within a wide range by a suitable selection of the distance between successive bodies.

N80-21286/3 PC **A10/MF A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Three-Dimensional Interactions and Vortical Flows with Emphasis on High Speeds.
D. J. Peake, and M. Tobak. Mar 80, 225p NASA-TM-81169, A-6035

Diverse kinds of three-dimensional regions of separation in laminar and turbulent boundary layers are discussed that exist on lifting aerodynamic configurations immersed in flows from subsonic to hypersonic speeds. In all cases of three dimensional flow separation, the assumption of continuous vector fields of skin-friction lines and external-flow streamlines, coupled with simple topology laws, provides a flow grammar whose elemental constituents are the singular points: nodes, foci, and saddles. Adopting these notions enables one to create sequences of plausible flow structures, to deduce mean flow characteristics, expose flow mechanisms, and to aid theory and experiment where lack of resolution in numerical calculations or wind tunnel observation causes imprecision in diagnosing the three dimensional flow features.

N80-21703/7 PC **A02/MF A01**
Cambridge Hydrodynamics, Inc., MA.
Stability Analysis for Laminar Flow Control, Part 2.
Final Report.
S. A. Orszag. Apr 80, 23p NASA-CR-3249
Contract NAS1-14907

Topics covered include: (1) optimization of the numerics of the SALLY stability analysis code; (2) relation between temporal and spatial stability theory; (3) compressible flow stability calculations; (4) spectral methods for the boundary layer equations; and (5) numerical study of nonlinear, nonparallel stability of incompressible flows.

N80-21704/5 PC **A03/MF A01**
Cambridge Hydrodynamics, Inc., MA.
Numerical Simulation of Shear Flows over Wavy Boundaries.
Final Report.
S. A. Orszag. Apr 80, 40p NASA-CR-3271, CHI-26
Contract NAS1-15383

The full time-dependent two dimensional Navier-Stokes equations are solved using spectral methods to achieve high spatial accuracy and high order time-splitting methods together with conformal mapping methods to allow simulation of flow over steep waves, including general turbulent Reynolds stresses. The programs are used to study the properties of laminar and turbulent flow over a flat plate and in various wavy geometries. Results are compared with both available theory and experiment. For laminar flow, good agreement is achieved. For turbulent flow, the agreement is less satisfactory and may be explained by the simplified turbulent modelling use in the calculations.

N80-21716/9 PC **A04/MF A01**
European Space Agency, Paris (France).
Boundary Layers in Oscillating Flow.
J. Cousteix. Dec 79, 60p ESA-TT-603, ONERA-NT-1979-1
Transl. Into English of 'Couches Limites en Ecoulements Pulse', Onera, Paris Report Onera-NT-1979-1, 1979. Original Report in French Previously Announced as N80-17416.

The state of the art in the field of unsteady boundary layers is reviewed, beginning with some fundamental results obtained on oscillating laminar boundary layers. Experimental and theoretical progress in flows which are periodic in the mean, the external velocity varying about a zero or non-zero mean value, are emphasized.

N80-22223/5 PC **A06/MF A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
La Recherche Aerospatiale Bi-Monthly Bulletin Number 1979-1.
Nov 79, 107p ESA-TT-599
Transl. By Onera into English of 'La Rech. Aerospatiale, Bull. Bimestriel' (Paris) No. 1979-1, Jan.-Feb. 1979 p 1-85. Original French Report Available from Onera, Paris Ff 36.

No abstract available.

N80-22231/8 PC **A05/MF A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
La Recherche Aerospatiale Bi Monthly Bulletin Number 1979-2.
Nov 79, 89p ESA-TT-605

Transl. By Onera into English of la Rech. Aerospatiale Bull. Bimestriel (Paris) No. 1979-2, Mar.-Apr. 1979 p 75-140. Original French Report Available from Onera, Paris Ff 36.

No abstract available.

N80-22239/1 PC **A05**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
La Recherche Aerospatiale Bi-Monthly Bulletin Number 1979-3.
Jan 80, 87p ESA-TT-609
Transl. By Onera into English of la Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1979-3, May-Jun. 1979 p 153-218. Original French Report Available from Onera, Paris Ff 36.

No abstract available.

N80-22247/4 PC **A05**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
La Recherche Aerospatiale Bi-Monthly Bulletin Number 1979-4.
Jan 80, 90p ESA-TT-612
Transl. By Onera into English of la Rech. Aerospatiale, Bull. Bimestriel (Paris) No. 1979-4, Jul.-Aug. 1979 p 219-285. Original French Report Available from Onera, Paris Ff 36.

No abstract available.

1B. Aeronautics

PB80-177306 PC **A05**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Technology.
Light Twin-Engine Aircraft Accidents Following Engine Failures, 1972-1976.
Special study.
13 Dec 79, 89p NTSB-AAS-79-2

The National Transportation Safety Board has studied the data collected during the investigation of 477 light-twin aircraft accidents from 1972 through 1976 which involved engine failure or malfunction. The complete records of particularly pertinent accidents were studied in detail. Pilot handbooks and other sources which provide information on engine-out performance and emergency procedures in light-twins were reviewed. A limited number of interviews with pilots and instructors were conducted. FAA training regulations were also studied. A major conclusion of the study is that many of these accidents involved a lack of pilot proficiency in managing a light-twin after loss of power in one engine. Four recommendations are made to the FAA for corrective action and one previously made recommendation is reiterated.

PB80-910402 PC**$5.00**/MF**$5.00**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Aircraft Accident Report - Thurman L. Munson Cessna Citation 501, N15NY, Near Canton, Ohio, August 2, 1979.
16 Apr 80, 30p NTSB-AAR-80-2
Paper copy also available on subscription, North American Continent price $50.00; all others write for quote.

About 1602 e.d.t., on August 2, 1979, a Cessna Citation piloted by Mr. Thurman L. Munson crashed short of runway 19 at the Akron-Canton Airport near Canton, Ohio. The pilot was practicing touch-and-go landings during a local flight with two passengers aboard. The aircraft first touched down in a relatively level, clear area about 870 ft short of the runway. The aircraft slid through a small clump of trees, hit a large stump, and came to rest on a road adjacent to the airport boundary fence. Fire erupted immediately after the aircraft came to rest. The two passengers escaped from the wreckage; the pilot was killed. The National Transportation Safety Board determines that the probable cause of the accident was the pilot's failure to recognize the need for, and to take action to maintain, sufficient airspeed to prevent a stall into the ground during an attempted landing. The pilot also failed to recognize the need for timely and sufficient power application to prevent the stall during an approach conducted inadvertently without flaps extended.

PB80-911403 PC**$10.00**
National Transportation Safety Board, Washington, DC. Bureau of Technology.
Aircraft Accident Reports - Brief Format U.S. Civil Aviation Issue Number 6 - 1979 Accidents.
1 May 80, 186p NTSB-BA-80-3
Paper copy also available on subscription, North American Continent price $50.00; all others write for quote.

The publication contains selected aircraft accident reports, in brief format, occurring in U.S. civil aviation operations during calendar year 1979. The 301 General Aviation accidents contained in this publication represent a random selection. This publication is issued irregularly, normally fifteen times each year. The brief format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated by injury index, injuries, and causal factors.

1C. Aircraft

AD-A083 137/0 PC **A04**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Evaluation of Existing Flammability Test Methods by Comparison of the Flammability Characteristics of Interior Materials.
Final rept. Oct 76-Jun 79,
Eldon B. Nicholas. Mar 80, 54p Rept no. FAA-NA-79-46

Twenty aircraft materials representing a cross section of the interior of a wide-bodied passenger compartment were tested by five laboratory test methods for comparability. The five test methods utilized were: (1) Radiant Panel, (2) Rate of Heat Release, (3) Vertical Bunsen Burner, (4) Limited Oxygen Index, and (5) Thermogravimetric Analysis. Correlation of the results obtained from the five test methods were made for ignitability, flame spread, heat release, performance, heat flux exposure, and ranking of materials by performance. Heat release data obtained from the Rate of Heat Release Apparatus and the E-162 radiant panel indicate the best correlation for panels. (Author)

AD-A083 191/7 PC **A04**/MF **A01**
National Aeronautics and Space Administration Moffett Field CA Ames Research Center
On the Nonlinear Deformation Geometry of Euler-Bernoulli Beams.
Technical paper,
Dewey H. Hodges, Robert A. Ormiston, and David A. Peters. Apr 80, 57p NASA-A-7985, USAAVRADCOM-TR-80-A-1, NASA-TP-1566

Nonlinear expressions are developed to relate the orientation of the deformed-beam cross section, torsion, local components of bending curvature, angular velocity, and virtual rotation to deformation variables. These expressions are developed in an exact manner in terms of a quasi-coordinate in the space domain for the torsion variable. The entire formulation is independent of the sequence of the three rotations used to describe the orientation of the deformed-beam cross section. For more common cases in the literature in which one of the three rotation angles is used as the torsion variable, the resulting equations depend on the choice of the three angles. Differences in the equations, however, are demonstrated to be in form only. The present deformed-beam kinematic quantities are proven to be equivalent to those derived from various rotation sequences by identifying appropriate changes of variable based on fundamental uniqueness properties of the deformed beam geometry. This development helps to clarify the issues raised in the literature concerning the choice of the angles. The torsion variable used herein is also shown to be mathematically analogous to an axial deflection variable that has been commonly used in the literature. Both variables are quasi-coordinates in the space domain and have been used in derivations based on Hamilton's principle, despite lack of rigorous justification. Rigorous applicability of Hamilton's principle to systems described by a class of quasi-coordinates that includes these variables is formally established. (Author)

AD-A083 228/7 PC **A06**/MF **A01**
Douglas Aircraft Co Long Beach CA
Primary Adhesive Bonded Structure Technology (PABST). Phase III. Tooling, Fabrication and Quality Assurance.
Final rept. Feb 75-Jun 79,
K. L. Land, and F. B. Lennert. 15 Oct 79, 111p MDC/MR/DR-983, AFFDL-TR-79-3154
Contract F33615-75-C-3016
See also AD-A041 536.

The Primary Adhesively Bonded Structure Technology (PABST) program's overall objective was to demonstrate significant improvements in cost, integrity, and durability of primary fuselage structures using latest adhesive bonding techniques, materials, and processes. Accordingly, this document summarizes the findings during Phase III, Fabrication, and details highlights of the Manufacturing and Quality Assurance effort in the areas of Tooling and Fabrication. Construction of the Full Scale Demonstration Component (FSDC) provides important performance comparisons of various bond tools, surface preparation techniques, adhesives, primers, bagging approaches and inspection methods. The fabrication of large constant and non-constant section bonded panels for the FSDC also provided invaluable manufacturing experience; established a natural testbed for validation of Phase II, Detail Design; and yielded excellent feedback for advancement of the PABST technology in Engineering, Materials and Process, and Quality Assurance. (Author)

AD-A083 248/5 PC **A05**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Unsteady Pressure Measurements on Oscillating Models in European Wind Tunnels.
Technical memo.,
James J. Olsen. Mar 80, 83p Rept no. AFWAL-TM-80-1-FIBR

The purpose of this report is to summarize the broad aspects of the aerodynamic tests that have been performed over the last twenty years on oscillating bodies and wings in European wind tunnels. While an extensive list of references is available in the open literature, there does not seem to be a general awareness in the United States government or aerospace industry of the intensity and diversity of European efforts. This report gives the background of the development of the major European testing facilities and illustrates the payoffs that have been accrued in the Netherlands, Germany, France and England.

AD-A083 365/7 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Aeronautical Knowledge (Selected Articles).
I. Mu, Chu Te-po, and Chang Li-ch'ien. 5 Jul 79, 20p Rept no. FTD-ID(RS)T-0843-79
Edited trans. of Hang K'ung Chih Shih (China) n12 p20-21, 23, 25-26 1978, by J. Wing.

No abstract available.

AD-A083 374/9 PC **A13**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Physical Bases of Aircraft Icing.
I. P. Mazin. 31 Aug 79, 277p Rept no. FTD-ID(RS)T-1161-79
Unedited machine trans. of mono. Fizicheskiy Osnovy Obledeneniya Samoletov, Gidrometeoizdat, Moscow, 1957 p1-120.

No abstract available.

AD-A083 454/9 PC **A05**/MF **A01**
Teledyne Brown Engineering Huntsville AL Electronics Div
Instrumentation Validation.
Technical rept. Mar-Apr 79.
May 79, 78p Rept no. ED79-ADTC-2334
Contract F08635-77-C-0293

An analytic and test validation was performed on the GVT Facility instrumentation. The purpose of the test was to determine the capability of the GVT System to perform its intended mission of dynamic analysis of aircraft structures. Each element of the system was examined to determine its individual function as well as its intended and unintended interaction with every other element of the system. The system was tested for signal input accuracy, cable integrity, grounding, noise susceptibility, and output signal integrity. All components were found

to be well-maintained and functioning properly. The only discrepancies found in the system relate to system analog grounding. Recommended corrective measures to eliminate these discrepancies are outlined. With the implementation of the recommendations contained in this report, the GVT should be an excellent tool for dynamic analysis of aircraft structures and the instrumentation should provide constant, repeatable results under all test conditions.

AD-A083 541/3 PC **A18**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Design of Aircraft (Selected Chapters).
A. A. Badyagin, S. M. Yeger, V. F. Mishin, F. I. Sklyanskiy, and N. A. Fomin. 10 Jul 79, 422p
Rept no. FTD-ID(RS)T-0521-79
Unedited machine trans. of mono. Proyektirovaniye Samoletov, 2-ye. Moscow, 1972, p1-14, 26-55, 69-85, 97-149, 189-225.

No abstract available.

N80-21279/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Supersonic Wings with Significant Leading-Edge Thrust at Cruise.
A. W. Robins, H. W. Carlson, and R. J. Mack. Apr 80, 28p NASA-TP-1632, L-13316

Experimental/theoretical correlations are presented which show that significant levels of leading-edge thrust are possible at supersonic speeds for certain planforms having the geometry to support the theoretical thrust-distribution potential. The new analytical process employed provides not only the level of leading-edge thrust attainable but also the spanwise distribution of both it and that component of full theoretical thrust which acts as vortex lift. Significantly improved aerodynamic performance in the moderate supersonic speed regime is indicated.

N80-21282/2 PC **A05**/MF **A01**
Analytical Methods, Inc., Bellevue, WA.
USSAERO Computer Program Development, Versions B and C.
Final Report 1974 - 1979.
F. A. Woodward. Apr 80, 82p NASA-CR-3227
Contract NAS1-12900

Versions B and C of the unified subsonic and supersonic aerodynamic analysis program, USSAERO, are described. Version B incorporates a new symmetrical singularity method to provide improved surface pressure distributions on wings in subsonic flow. Version C extends the range of application of the program to include the analysis of multiple engine nacelles or finned external stores. In addition, nonlinear compressibility effects in high subsonic and supersonic flows are approximated using a correction based on the local Mach number at panel control points. Several examples are presented comparing the results of these programs with other panel methods and experimental data.

N80-21283/0 PC **A12**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Advanced Technology Airfoil Research, Volume 2.
1979, 262p NASA-CP-2046, L-12232
Presented at Conf., Langley Research Center, Hampton, VA. 7-9 Mar. 1978.

A comprehensive review of airfoil research is presented. The major thrust of the research is in three areas: development of computational aerodynamic codes for airfoil analysis and design, development of experimental facilities and test techniques, and all types of airfoil applications.

N80-21285/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
High Speed Turboprops for Executive Aircraft, Potential and Recent Test Results.
D. C. Mikkelson, and G. A. Mitchell. 1980, 26p NASA-TM-81482, E-419
Presented for the Turbine-Powered Executive Meeting, (Phoenix), 9-11 Apr. 1980, Sponsored by the Soc. Of Automotive Engr.

Four high speed propeller models were designed and tested in an 8x6 foot wind tunnel in order to evaluate the potential of advanced propeller technology. Results from these tests show that the combination of: increased blade number, aerodynamically integrated propeller/nacelles, reduced blade thickness, spinner area ruling, and blade sweep are important in achieving high propeller efficiency at the high cruise speeds.

N80-21287/1 PC **A07**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
An Experimental Evaluation of a Helicopter Rotor Section Designed by Numerical Optimization.
R. M. Hicks, and W. J. Mccroskey. Mar 80, 131p NASA-TM-78622, AVRADCOM-TR-79-44

The wind tunnel performance of a 10-percent thick helicopter rotor section design by numerical optimization is presented. The model was tested at Mach number from 0.2 to 0.84 with Reynolds number ranging from 1,900,000 at Mach 0.2 to 4,000,000 at Mach numbers above 0.5. The airfoil section exhibited maximum lift coefficients greater than 1.3 at Mach numbers below 0.45 and a drag divergence Mach number of 0.82 for lift coefficients near 0. A moderate 'drag creep' is observed at low lift coefficients for Mach numbers greater than 0.6.

N80-21293/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Emergency in-Flight Egress Opening for General Aviation Aircraft.
L. J. Bement. Apr 80, 25p NASA-TM-80235, L-13615

In support of a stall/spin research program, an emergency in-flight egress system is being installed in a light general aviation airplane. To avoid a major structural redesign for a mechanical door, an add-on 11.2 kg pyrotechnic-actuated system was developed to create an opening in the existing structure. The airplane skin will be explosively severed around the side window, across a central stringer, and down to the floor, creating an opening of approximately 76 by 76 cm. The severed panel will be jettisoned at an initial velocity of approximately 13.7 m/sec. System development included a total of 68 explosive severance tests on aluminum material using small samples, small and full scale flat panel aircraft structural mock-ups, and an actual aircraft fuselage. These tests proved explosive sizing/severance margins, explosive initiation, explosive product containment, and system dynamics.

N80-21294/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Nasa Low-and Medium-Speed Airfoil Development.
R. J. Mcghee, W. D. Beasley, and R. T. Whitcomb. Mar 79, 19p NASA-TM-78709, L-12264
Presented at NASA Conf. On Advanced Tech. Airfoil Res., Langley Research Center, Hampton, VA., 7-9 Mar. 1979.

The status of NASA low and medium speed airfoil research is discussed. Effects of airfoil thickness-chord ratios varying from 9 percent to 21 percent on the section characteristics for a design lift coefficient of 0.40 are presented for the initial low speed family of airfoils. Also, modifications to the 17-percent low-speed airfoil to reduce the pitching-moment coefficient and to the 21-percent low speed airfoil results are shown for two new medium speed airfoils with thickness ratios of 13 percent and 17 percent and design-lift coefficients of 0.30. Applications of NASA-developed airfoils to general aviation aircraft are summarized.

N80-21295/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Wind-Tunnel Results for an Improved 21-Percent-Thick Low-Speed Airfoil Section.
R. J. Mcghee, and W. D. Beasley. Apr 78, 47p NASA-TM-78650, L-11970

Low speed wind tunnel tests were conducted to evaluate the effects on performance of modifying a 23 percent thick low speed airfoil. The airfoil contour was altered to reduce the upper-surface adverse pressure gradient and hence reduce boundary layer separation. The chord Reynolds number varied from about 2,000,000 to 9,000,000.

N80-21298/8 PC **A09**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.). Inst. fuer Flugfuehrung.
Evaluation of a Central Data Entry System (CDES) for Transport Aircraft.
F. V. Schick, D. Brunner, E. H. Neumann, and H. D. Schenk. Jul 79, 179p DFVLR-FB-79-23

A Central Data Entry System (CDES) for transport aircraft was developed for saving panel space and for common operation of various onboard flight management systems. A fully functional CDES model was flown by 27 airline pilots under realistic mission conditions in a flight simulator based evaluation program. Pilot performance and judgment data were analyzed in view of comparing CDES entries with conventional entries and studying CDES location alternatives in the cockpit, turbulence effects on CDES handling, training required for familiarization with the CDES, layout of CDES hardware and software, and the range of CDES capacities. The results show good feasibility and a high degree of pilot acceptance.

N80-21315/0 PC **A04**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Investigations of an Active Vibration Isolation System for Helicopters.
G. Reichert, and H. Strehlow. Nov 79, 58p RAE-LIB-TRANS-1993, BR73047
Transl. Into English from Luftfahrt Forschung und Luftfahrttechnologie Statusseminar (Bonn), 1978.

Active and passive methods of minimizing the effects of rotor induced excitation forces on the fuselage vibration characteristics by isolating the rotor/transmission system from the fuselage are described. Attention is focussed on an active control system which was developed for eventual use on the BO 105 research helicopter. The advantages of active control systems over passive systems for isolating the helicopter fuselage from rotor induced excitation are discussed.

N80-21316/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Supersonic Cruise Aircraft Research: An Annotated Bibliography.
M. H. Tuttle. Apr 80, 21p NASA-TM-81781

This bibliography, with abstracts, consists of 69 publications arranged in chronological order. The material may be useful to those interested in supersonic cruise fighter/penetrator/interceptor airplanes. Two pertinent conferences on military supercruise aircraft are considered as single items; one contains 37 papers and the other 29 papers. In addition, several related bibliographies are included which cover supersonic civil aircraft and military aircraft studies at the Langley Research Center. There is also an author index.

N80-21318/4 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Parametric Study of Variation in Cargo-Airplane Performance Related to Progression from Current to Spanloader Designs.
T. A. Toll. Apr 80, 53p NASA-TP-1625, L-13208

A parametric analysis was made to investigate the relationship between current cargo airplanes and possible future designs that may differ greatly in both size and configuration. The method makes use of empirical scaling laws developed from statistical studies of data from current and advanced airplanes and, in addition, accounts for payload density, effects of span distributed load, and variations in tail area ratio. The method is believed to be particularly useful for exploratory studies of design and technology options for large airplanes. The analysis predicts somewhat more favorable variations of the ratios of payload to gross weight and block fuel to payload as the airplane size is increased than has been generally understood

from interpretations of the cube-square law. In terms of these same ratios, large all wing (span-loader) designs show an advantage over wing-fuselage designs.

N80-21328/3 PC A05/MF A01
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
Program for Impact Testing of Spar-Shell Fan Blades, Test Report.
R. Ravenhall, and C. T. Salemme. Apr 78, 95p
NASA-CR-135393, R78AEG444
Contract NAS3-20801

Six filament-wound, composite spar-shell fan blades were impact tested in a whirligig relative to foreign object damage resulting from ingestion of birds into the fan blades of a QCSEE-type engine. Four of the blades were tested by injecting a simulated two pound bird into the path of the rotating blade and two were tested by injecting a starling into the path of the blade.

N80-21344/0 PC A18/MF A01
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Active Control Technology, Volume 2.
1978, 411p VKI-LEC-SER-1979-1-V-2
2. Lecture Held at Rhode-Saint-Genese, Belgium, 4-8 Dec. 1978.

No abstract available.

N80-21358/0 PC A04/MF A01
European Space Agency, Paris (France).
In Flight Tests of a Parameter Insensitive Controller.
G. Kreisselmeier, and R. Steinhauser. Nov 79, 75p ESA-TT-565, DFVLR-FB-78-07
Transl. Into English of "Flugversuchsergebnisse MIT Einem Parameterunempfindlichen Regler", Rept. Dfvlr-FB-78-07 Dfvlr, Oberpfaffehofen, (Germany, F.R.), May 1978. Original Report in German Previously Announced as N79-30197. Original German Report Available from Dfvlr, Cologne Dm 30,30.

A design procedure for controllers is presented which makes it possible to allow for all the demands made on control behavior. It was used to design a controller for the longitudinal motion of the D0-28D Skyservant that ensures maintenance of the desired flying qualities in both the guidance and the disturbance behavior throughout the flight range of the aircraft. The design pays particular attention to obtaining a low elevator setting speed and a harmonic time pattern of the elevator deflection. The influence of the airborne computer on the control behavior is examined and the results of the flight tests are compared with those of the simulations.

1E. Air Facilities

AD-A083 597/5 PC A06/MF A01
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Nondestructive Testing for Light Aircraft Pavements. Phase I. Evaluation of Nondestructive Testing Devices.
Final rept. Apr 78-Jul 79,
Albert J. Bush, III. Jan 80, 103p FAA-RD-80-9
Contract DOT-FA78WAI-848

Methodologies have been developed for nondestructive testing (NDT) and evaluation of air carrier airport pavements. This study, a two-phase program, addresses those pavements that are designed to support aircraft with gross weights of less than 30,000 lb. Phase I, reported herein, is to evaluate commercially available NDT devices with respect to operational characteristics, costs, transportability by cargo aircraft, accuracy, and reproducibility of measurements, and suitability for use in evaluating light aircraft pavements. The equipment evaluated included the Benkelman Beam, Dynaflect, Falling Weight Deflectometer, and Models 400, 510, and 2008 Road Raters. The WES 16-kip vibrator was used as a comparison device. Based on the evaluation parameters, the Dynaflect, Model 2008 Road Rater, and Falling Weight Deflectometer are evaluated applicable for testing light aircraft pavements. (Author)

2. AGRICULTURE

2B. Agricultural Economics

PB80-170822 PC A04/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. Natural Resource Economics Div.
Economic Analysis of Utilizing Corner Areas of Center Pivot Irrigated Fields for Wildlife Habitat in the San Luis Valley, Colorado,
Ronald R. Rhoade. Mar 79, 74p

Center pivot irrigation systems leave field corners unirrigated. Four alternatives were analyzed for utilizing field corners in the San Luis Valley: (1) Irrigation by conventional surface system; (2) Idle corners, with cultivation to control weeds; (3) Provide permanent cover for corners; and (4) Mechanical corner irrigation system in combination with the center pivot. Alternative 4 was most profitable for the farmer but required the highest investment. Benefits from Alternative 3 included reduced wind erosion, control of noxious weeds and increased wildlife habitat. These benefits, some of which would accrue to nonfarmers, were not evaluated momentarily.

PB80-174469 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
KENEF: A Potential Pulp Crop,
Clarence A. Moore. Aug 79, 37p

The study evaluates kenaf as a new crop potential in the southern coastal plains region for use in the pulp and paper industry. Study results are in terms of the 1977 price level. Cost estimates for producing kenaf were liberal and ranged from $19 to $25 per ton for a 10-ton per acre yield and from $35 to $46 per ton for a 5-ton yield. The 5-ton and 10-ton yields represent the lower and upper ranges generally considered likely if it is grown commercially. At $30 per ton delivered at the mill, kenaf could compete with corn at yields ranging from 5.2 to 6.3 tons per acre, with cotton from 5.9 to 8.9 tons, and with soybeans from 7.2 to 8.9 tons. At $40 per ton delivered, the competitive yield range is 3.9 to 6.7 with soybeans. Kenaf can be profitably grown in competition with other crops in the southern coastal plains.

PB80-175219 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. Cooperative Development Div.
Potentials for an Arkansas Broiler Producers Cooperative,
Phillip F. Brown, and Donald Simon. Sep 79, 27p

Within a 4-county area, 81 broiler growers with an 11-million bird growout capacity expressed interest in a cooperative to supply them with chicks, feed and market the birds. Most growers are unwilling or unable to subscribe the approximate $3.7 million required for 25 percent equity in new facilities. Growers' options include (1) do nothing further; (2) consider contract bargaining; or, (3) enlist a qualified consultant to develop alternatives which might include purchased inputs, leased facilities, contracted processing and marketing, or other strategies.

PB80-175227 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
A 'Steady-State' Meat Sector for the 1980's,
Richard Crom. Sep 79, 31p

Levels of livestock and poultry production consistent with expected trends in consumer demand for beef (fed and nonfed), pork, and poultry is specified for the 1980's. Consumer demand for red meat and poultry is estimated as a function of income; the demand for individual meats is constrained by overall demand but allocated on the basis of historical trends and judgment. The composition of the livestock and poultry population necessary to support this level of consumption is based on a specific set of assumptions; and is maintained at a level to avoid cyclical production patterns.

2C. Agricultural Engineering

COO-4531-7 PC A02/MF A01
Illinois Inst. of Tech., Chicago.
Beneficial Use of Waste Heat for Surface Irrigation. Technical Report TR-79-2.
S. Sreenivasan, and R. W. Porter. Aug 79, 21p
Contract EC-77-S-02-4531

The feasibility of utilizing once-through cooling water discharge from large steam-electric power plants for surface irrigation was investigated. Advantages for the power plant include reduced turbine back pressure with greater power output and thermal efficiency, as well as reduced cost and environmental impact, as compared with closed-cycle cooling systems. Crops could benefit from moderately elevated water temperatures of irrigation which tend to increase yield for certain species. As an example, a 2000 MW(e) fossil-fueled plant was analyzed. It was determined that about 178,000 acres would be required under typical optimal average spray-irrigation rates of 1.5 inches/week and the optimal field crop, corn. For this size system, water temperatures would be in near natural equilibrium at the average crop location. Thus no thermal advantage can be claimed for crop growth. Considering the irrigation system investment and return, the net cost of cooling in 1980 dollars was estimated as 4 mills/kWh as compared with 0.7 and 1.7 for wet and dry mechanical-draft towers, respectively. In the case of tomatoes, a net profit of 3 mills/kWh might be achieved assuming that the market could absorb the enormous yield, which is unlikely. During non-irrigation periods, a conventional cooling system, or the irrigation distribution system with a bypass return to the plant or the natural water body would have to be employed at additional cost. The prospects of using hot-water blowdown for more limited surface irrigation appears more practical and may be viable as a system zero-discharge alternative. (ERA citation 05:016066)

COO-5141-3 PC A02/MF A01
Connecticut Univ., Storrs.
Improvement of Yields and Rates During Enzymatic Hydrolysis of Cellulose to Glucose. Progress Report, June 1-August 31, 1979.
D. W. Sundstrom, H. E. Klei, and R. W. Coughlin. Oct 79, 18p
Contract ET-79-S-02-5141

During this quarter experiments were conducted on enzymatic hydrolysis of cellulose using T. reesei cellulase together with the immobilized beta -glucosidase (beta -G) described in earlier reports. In batch, slurry, and fluidized bed reactors, the presence of the immobilized beta -G reduced cellobiose concentrations to low levels, such that glucose yields were increased by over 100% with Solka floc and corn stover as substrates. Acid pretreated corn stover from the Dartmouth group was readily hydrolyzed by cellulase when combined with our immobilized beta -G, giving glucose yields comparable to that from Solka flox. based on cellulose content. These studies complete the major tasks outlined in our original proposal. During the past twelve months: microbial beta -glucosidase (beta -G) from A. phoenicis has been produced and purified; the (beta -G) has been immobilized on an alumina support yielding long half lives and having immobilization activities above 80%; The immobilized beta -G in several enzymatic reaction systems has been tested using a practical cellulose source (corn stover); and glucose yield has been increased by over 100% by employing the immobilized beta -G. This promising enzyme reaction system will be developed further under funding based on a renewal application already submitted to SERI. (ERA citation 05:015059)

PB80-173719 PC A08/MF A01
Instituto de Investigaciones Tecnologicas, Bogota (Colombia).
Diagnostico y Evaluacion Tecnica de los Molinos de Cana para Panela (Diagnosis and Technical Evaluation of Cane Mills to Obtain Brown Sugar).
Final rept.
1978, 153p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC., and Fondo Colombiano de Investigaciones Cientificas

y Proyectos Especiales, Bogota.Color illustrations reproduced in black and white.

This study gives an evaluation and diagnosis of the mechanical equipment used for the grinding of sugar cane for the production of molasses. The material is expressed in elementary principles of mechanics and design of machinery. Tables and photographs are included for information.

PB80-174840 PC **A07**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Grain Inspection and Weighing Systems in the Interior of the United States - An Evaluation.
Report to the Congress.
14 Apr 80, 132p CED-80-62

The Grain Standards Act of 1976 made a number of substantive changes to improve the interior (nonexport) grain inspection and weighing systems. It also required GAO and the Department of Agriculture to study the systems. Based on its study, GAO believes that the overall structures of the systems should be retained. However, the Department needs to take a number of actions to strengthen the services available under the act and its controls over such services.

PB80-174923 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Explosibility of Agricultural Dusts.
Rept. of investigations,
Murray Jacobson, John Nagy, Austin R. Cooper, and Frank J. Ball. 1961, 28p BUMINES-RI-5753

Data obtained by the Federal Bureau of Mines on the dust explosion hazard in air are presented for 220 samples of agricultural products. Information is given on ignition temperature of dust clouds and layers, minimum explosive concentration, minimum electrical energy for ignition, explosion pressure and rates of pressure rise, amount of inert dust required to prevent flame propagation, and in a few instances, the permissible oxygen concentration in an atmosphere to prevent ignition by spark and by heated surface. The effects of particle size and source of sample on explosibility are shown. The relative ignition sensitivity, severity of explosion, and overall explosibility of the material are characterized by empirical index. The report contains data obtained by the Bureau in laboratory studies on the explosion hazards of agricultural dusts. Recognition of the dangers will encourage adoption of adequate measures to prevent ignition and explosion during preparation, processing, and utilization of the materials.

PB80-175847 PC **A16**/MF **A01**
Department of Agriculture, Washington, DC.
Machines for Cleaning and Sorting of Seeds,
Jozef Grochowicz. c1980, 375p TT-76-54053
Trans. of mono. Maszyny do Czyszczenia i Sortowania Nasion, Warsaw, 1971, by Zdzislaw Markiewicz. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Separation processes, that is, the cleaning and sorting of seed, like most agricultural processes, make use of the different physical properties of the material being processed. Higher yields and economic reasons are forcing man to intensify separation processes by applying new, better methods, e.g., vibration or electrostatic methods. The purpose of this work is to help those concerned to acquire better knowledge and understanding of the separation processes used in agriculture as well as the methods of and equipment for seed cleaning and sorting.

PB80-182900 PC **A07**/MF **A01**
Environmental Protection Agency, Washington, DC. Municipal Construction Div.
Cost of Land Treatment Sytems.
Technical rept.,
Sherwood C. Reed, Ronald W. Crites, Richard E. Thomas, and Alan B. Hais. Sep 79, 145p EPA-430/9-75-003-R, EPA/MCD-10-R
Revision of report dated Jun 75.

The purpose of this report is to aid the planner and engineer in evaluating monetary costs and benefits of land treatment systems. The three basic modes are slow rate (formerly irrigation), rapid infiltration and overland flow.

PB80-807274 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Use of Irrigation in Food Growing. October, 1973-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Oct 73-Dec 79,
C. Gilbert Young. May 80, 196p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited works cover the field of crop irrigation: sources of water, contaminants including salt, methods of application, design of flow geometry, and net results on the crop species. Also discussed is the use of effluent waters of various kinds for irrigation, and the resultant odor, taste and nutritional, and contamination, effects on the food. (Contains 199 abstracts)

2D. Agronomy and Horticulture

PB80-170624 PC **A03**/MF **A01**
Nevada Univ. System, Reno. Water Resources Center.
Hydrologic Feasibility of Utilizing Palms for Water Management in Southern Nevada.
Completion rept.,
Ralph O. Patt, and Douglas E. Zimmerman. Mar 78, 29p W80-04504, OWRT-A-073-NEV(1)
Contract DI-14-31-0001-6029

The feasibility of utilizing date and ornamental palms as a management tool for beneficial use of groundwater and waste water in water-short areas such as the southwestern United states was investigated. Three potential planting sites in southern Nevada, the Las Vegas, Pahrump, and Moapa Valleys, were studied. Local climatic conditions in these areas were determined to be suitable for palm propagation. Date culture requires long, hot summers, moderate winters, and low precipitation and humidity from July 1 to September 1, the rapid fruit growth period. Palms readily adapt to various soils and will endure saline soil once established. For the three sites studied the only limiting factors found appear to be the availability and source of water supply. The Las Vegas Valley appears to be the most favorable site studied since it is underlain by shallow groundwater, and irrigation from sewage effluent is available.

PB80-928205 PC **E02**/MF **A01**
Central Intelligence Agency, Washington, DC.
Hybrid Rice Development and Seed Production in China.
Research paper.
May 80, 12p SW-80-10022
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928200.

Although hybrid rice varieties have contributed significantly to recent increases in rice production, this rice will not give the Chinese a long-term advantage over other types because of significant problems encountered, including the difficulty of economically producing large quantities of hybrid rice seed.

2E. Animal Husbandry

PB80-175425 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Statistical Research Div.
Detecting a Rotational Bias on Multiple Frame Surveys,
Kathy Burstrom Hall. Dec 79, 22p

An analysis of hog data from six States shows that a rotational bias had an important effect on list estimates in only one State. One other State had a significant difference in nonresponse rates due to rotation. Thus, although rotational bias does not appear to be a frequent problem for list estimates, even as an occasional problem it may indicate the need for rotating the sample more often on list surveys.

PB80-175433 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Statistical Research Div.
The Effect of Telephone Enumerators and Evaluating a New Operation Description,
Kathy Burstrom Hall. Sep 79, 28p

The report summarizes the significant impact of enumerators on telephone interviews and the preliminary use of a new operation description section. The testing of the telephone enumerator effect was performed during the data collection process for the Multiple Frame Hog Survey conducted by the U.S. Department of Agriculture.

PB80-175466 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Statistical Research Div.
The Effects of Data Collection Methods,
Kathy Burstrom Hall, and Barry Ford. Oct 79, 38p

At a seven-state level, four methods of data collection yield significantly different estimates of the number of hogs. This significance is due to a multivariate test on operators reporting a positive number of hogs. Data collection methods also have a significant interaction with the states and cause a difference in response rates which is almost significant.

PB80-175623 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Sheep Production: Intensive Systems, Innovative Techniques Boost Yields.
Agricultural economic rept.,
Virden L. Harrison. Mar 80, 50p AER-452

Lamb production per ewe can be doubled or tripled through intensive management practices and by use of certain innovations. Some of these practices include selecting for ewes that produce multiple births, inducing twice-a-year lambing, breeding ewes to lamb at one year of age, formulating diets for optimal weight gain and nutrition, and controlling losses due to diseases, parasites, and predators. New technologies are described and cost and return budgets are prepared for four types of sheep systems: two intensive management types and two pasture and open range types. Intensive sheep production using the latest innovations can be profitable at lamb prices near the 1979 level of about $65 to $70 per hundredweight.

2F. Forestry

PB80-170756 PC **A04**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Cooperative Development Div.
Development of a Forest Products Management and Marketing Cooperative in Maine,
William R. Seymour. Oct 79, 56p

Woodlot owners in the Dover-Foxcroft area of Maine requested assistance in developing a forestry cooperative that would provide professional assistance to woodlot owners in management of their woodlands and in the marketing of their forest products. Financial support for this development effort is being supplied by a U.S. Forest Service grant through the Maine Bureau of Forestry. Preliminary data indicates that by organizing a forest management and marketing cooperative, woodlot owners could increase their net income per acre harvested by up to 24 percent. However, before the development of a cooperative proceeds, a survey of woodlot owners' interest and commitment must be made in order to determine the organizational structure of the cooperative and specific services to be supplied.

PB80-174428 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Costs and Environmental Impacts of Harvesting Timber in Appalachia with a Truck-Mounted Crane.
Final rept.,
J. N. Kochenderfer, and G. W. Wendel. 1980, 16p NEFES/80-64, FSRP/NE-456

A truck-mounted crane was used to yard and load timber from a 30-acre sale in a 140-acre watershed in the mountains of north-central West Virginia. A total logging cost, excluding road costs, of $44.35/M bm for logs delivered to a mill 20 miles away was comparable to that reported for wheeled skidders. Road costs with gravel would add $55/M bm, without gravel $26/M bm. Roads built to these standards held sediment production within the range (.05 to .10 ton/acre/year) expected for undisturbed forested watersheds. Residual stand damage caused by this system was also comparable to other systems and was concentrated on small trees.

3. ASTRONOMY AND ASTROPHYSICS

3B. Astrophysics

AD-A083 144/6 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
Buoyant Magnetic Flux Tubes in Supergranules,
F. Meyer, H. U. Schmidt, G. W. Simon, and N. O. Weiss. 21 Aug 78, 12p Rept no. AFGL-TR-80-0086
Pub. in Astronomy and Astrophysics, v76 p35-45 1979.

No abstract available.

AD-A083 150/3 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
PPS76 - A Computerized 'Event Mode' Solar Proton Forecasting Technique,
D. F. Smart, and M. A. Shea. 1979, 23p Rept no. AFGL-TR-80-0084
Pub. in Solar-Terrestrial Predictions Proceedings, v1 p406-427 1979.

No abstract available.

AD-A083 237/8 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
Neutron Monitor Response to Non-Vertical Arrival Directions During GLE's,
M. A. Shea, D. F. Smart, P. J. Tanskanen, and J. E. Humble. 1979, 8p Rept no. AFGL-TR-80-0085
Pub. in The International Cosmic Ray Conference (16th) v12 p249-254 1979.

No abstract available.

AD-A083 477/0 PC **A02/MF A01**
California Univ Los Angeles Dept of Astronomy
The Effect of a Radial Rotational Velocity Gradient on p-Mode Eigenfrequencies,
Roger K. Ulrich, Edward J. Rhodes, Jr., and Franz-Ludwig Deubner. 18 Apr 78, 8p AFGL-TR-80-0113
Grants NSG-7158, NSF-AST76-20260
Pub. in The Astrophysical Jnl., v227 p638-644, 15 Jan 79.

No abstract available.

AD-A083 501/7 PC **A03/MF A01**
Stanford Univ CA Inst for Plasma Research
The Rotation of the Sun: Observations at Stanford.
Technical rept.,
P. H. Scherrer, John M. Wilcox, and Leif Svalgaard. Feb 80, 34p Rept no. SU-IPR-799
Contracts N00014-76-C-0207, NAS5-24420
Sponsored in part by grants NGR-05-020-559 and NSF-ATM77-20580.

Measurements of the photospheric rotation rate using the Doppler effect have been the subject of controversy since they were first made and have recently been reviewed. Daily observations at the Stanford Solar Observatory have been made since 1976. Analysis of the 950 full-disk low-resolution dopplergrams made to date yields results that conflict with some other recent sets of observations. The SSO observations show no daily or long period variations in the rotation rate that exceed observational error, and the average rate is about the same as that of large-scale magnetic field structures and sunspots. These conclusions are apparently inconsistent with the well-known results of Howard and Harvey (1970). (Author)

AD-A083 582/7 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
Some Effects of Acoustic Waves on Spectral-Line Profiles,
Lawrence E. Cram, Stephen L. Keil, and Peter Ulmschneider. 6 Apr 79, 9p Rept no. AFGL-TR-80-0115
Pub. in Astrophysical Jnl., v234 p768-774, 1 Dec 79. Prepared in cooperation with Wuerzburg Univ. (Germany, F.R.). Inst. fuer Astronomie und Astrophysik.

No abstract available.

AD-A083 583/5 PC **A02/MF A01**
California Univ San Diego La Jolla Dept of Physics
The Height Variation of Velocity and Temperature Fluctuations in the Solar Photosphere,
Stephen L. Keil, and Richard C. Canfield. 19 Oct 77, 13p AFGL-TR-80-0110
Grant AFOSR-76-3071
Pub. in Astronomy and Astrophysics, v70 p169-179 1978.

No abstract available.

AD-A083 585/0 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
A Possible Example of Giant Convective Cells Delineated by Magnetic Fields,
W. J. Wagner, and L. B. Gilliam. 29 Jun 76, 5p Rept no. AFGL-TR-80-0116
Pub. in Solar Physics, v50 p265-268 1976.

No abstract available.

ITP-76-120-E PC **A02/MF A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Gravitational Collapse of Relativistic Non-Ideal Hadron Gas.
A. I. Bugrii, and A. A. Trushevsky. 1976, 14p
U.S. Sales Only.

It is shown that the hadron system with vanishing chemical potential described by the equation of state P = AT exp 6 - BT exp 5 + CT exp 4 cannot be contracted to the point if the compression goes adiabatically. The closed oscillating Universe may compress only to the state with a final density without achieving the singularity. (Atomindex citation 09:405952)

JINR-R-2-11200 PC **A02/MF A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Origin of Magnetic Fields and Overdense Cosmology.
R. M. Muradyan. 1978, 8p
In Russian.
U.S. Sales Only.

The problem of the origin of galactic magnetic fields is investigated. The investigation is carried out in the framework of V.A. Ambartsumian's overdense cosmology conceptions. The hypothesis has been discussed that the observable at the present time galactic magnetic fields are shown to be the remnants of the dipole magnetic fields of protogalaxies-superhadrons. It is concluded that the detailed development of the problem on the origin of galactic magnetic fields is related to the general problems of galactic evolution and to the necessity of plotting the basic theory of superhadrons. (Atomindex citation 09:406049)

MPI-PAE/Astro-143 PC **A02/MF A01**
Max-Planck-Institut fuer Physik und Astrophysik, Muenchen (Germany, F.R.).
Formation of HII Regions. Pt. 1. The Champagne Model.
G. Tenorio-Tagle. Apr 78, 25p CONF-7804120-1
22. Herstmonceux conference, Herstmonceux, UK, 19 Apr 1978.
U.S. Sales Only.

Numerical models of the evolution of HII regions accounting for the fact that star formation takes place inside a dense cloud are presented. The gas dynamical effects produced after the ionization of the cloud's edge (from the inside) are here postulated to determine the size, velocity field, and large scale density variation observed in HII regions. The consequences and observational predictions from these models are also given. (Atomindex citation 09:415933)

N80-22146/8 PC **A03/MF A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Some 1.0 mm Maps and Radial Density Distributions of Southern HII/Molecular Cloud Complexes.
L. H. Cheung, J. A. Frogel, D. Y. Gezar, and M. G. Hauser. Feb 80, 33p NASA-TM-80654
Submitted for Publication.

Several 1.0 continuum mapping observations were made of seven southern hemisphere h12/molecular cloud complexes with 65 arcsec resolution. The radial density distribution of the clouds with central luminosity sources was determined observationally. Strong similarities in morphology and general physical conditions were found to exist among all of the southern clouds in the sample.

N80-22147/6 PC **A02/MF A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Two X-Ray Pulsars: 2S 1145-619 and 1E 1145.1-6141.
R. C. Lamb, T. H. Markert, R. C. Hartman, D. J. Thompson, and G. F. Bignami. Jan 80, 16p NASA-TM-80638, CSR-HEA-80-2

Observations from the Einstein observatory reveal a previously unreported source, 1e1145.1-6141, within 15 arcmin of 2s1145-619 and of comparable intensity during July 1979. Periodicity analysis of the data shows a 290 + or - 2s period for the 2s source and a 298 + or - 4s period for the IE source, confirming the previous Ariel V report of two periods in this range from this region of the sky.

N80-22148/4 PC **A02/MF A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
X-Ray Spectroscopy of Late-Type Stars.
J. H. Swank, and N. E. White. Mar 80, 23p
NASA-TM-80655
Presented at the Workshop on Cool Stars, Stellar Systems and the Sun, 31 Jan. 1980.

The solid state spectrometer on the Einstein Observatory determined .4 - 4.5 keV spectra for Capella, Algol and 6 RS CVn binaries. All show evidence for a bimodal distribution of emission measure with temperature with one component approximately 7 million degrees and one approximately 40 million degrees. The spread in values of both luminosity and emission measure is 10 for the low temperature component and approximately 500 for the high temperature component. Line emission due to Fe can be identified in most of them and abundances of Si, S and Fe are consistent with approximately solar values in all cases. Estimates indicate dimensions of the emitting regions are on the order of the stellar size and the binary separation for the low and high temperature components, respectively, unless the pressures are high. Variations in the flux were observed, mostly in the hard component for the RS CVn binaries, in the soft component for Capella. A flare was observed during primary eclipse of Algol. The possibility is discussed that the other variations could all be due to intrinsic variability with a time scale of hours-days rather than eclipse or modulation with photometric phase.

N80-22149/2 PC **A03/MF A01**
TAI Corp., Huntsville, AL.
Error Budget Analysis for Advanced X-Ray Astrophysics Facility (AXAF).
Final Report, Sep. 1979 - Mar. 1980.
D. Korsch. Mar 80, 40p NASA-CR-161425
Contract NAS8-33516

The AXAF telescope was analytically investigated during the period from September 1979 to March 1980. The results of a performance evaluation in the presence of aligment errors and surface defects, a sensitivity analysis of every individual subsystem, and a diffraction analysis of the telescope assembly are presented.

N80-22150/0 PC **A19/MF A01**
European Space Agency, Paris (France).

Astronomical Uses of the Space Telescope.
F. Macchetto, 1979, 434p
Prepared in Cooperation with European Southern Obs., Geneva. Proceedings of Esa/European Southern Obs. Workshop, Geneva, 12-14 Feb. 1979.

No abstract available.

N80-22192/2 PC **A03/MF A01**
European Space Agency, Paris (France).
Spectroscopy and Variability Mission in X-Ray Astronomy: Assessment Study.
Oct 79, 47p ESA-SCI(79)3

An assessment study of an X-ray astronomical observatory satellite is presented. The proposed spectroscopy and variability mission is designed to study carefully selected individual sources. The principal categories of objects to be studied are: nuclei of active galaxies and quasars, clusters of galaxies, X-ray emitting binary systems and their associated black holes, neutron stars or white dwarfs, X-ray burst sources, supernova remnants, and active stars and stellar coronae. A set of three instruments is proposed for the mission. The crystal spectrometers will follow iron emission and absorption features. The large area proportional counter array will have the high photon collecting power necessary to study variability in faint sources and to provide a monitor function for the crystal spectrometers. The phoswich detector will extend the spectral and variability measurements from a few keV to some 200 keV and will permit the detailed study of the recently discovered cyclotron features.

N80-22193/0 PC **A03/MF A01**
European Space Agency, Paris (France).
Timing and Transient Mission in X-Ray Astronomy: An Assessment Study.
Oct 79, 43p ESA-SCI(79)4

The proposed Spacelab timing and transient mission intends to study the temporal variability of a wide range of X ray emitters, to survey the sky every few days at a sensitivity on one Uhuru unit to monitor long term variability, to make a comprehensive study of the complex transient and burst phenomena; and (4) to extend X-ray spectral measurement to much higher energies. The baseline payload considered consists of four instruments. A large area proportional counter will provide the high photon collection rate needed for the timing experiment. The hard X ray response will be obtained by incorporation of a phoswich detector. A unique wide field camera will image the sky to detect, locate, and measure X-ray transient events, as well as X-ray and gamma bursts. Finally in order to detect brighter and rarer gamma ray bursts a small wide field of view gamma ray burst detector is included. The total mass of the satellite including both payload and spacecraft is about 950 kg, which is compatible with an Ariane launcher. Volume and overall dimensions do not exclude the use of a dual launch configuration. An equatorial orbit at an altitude of less than 600 km will be required in order to keep the instrument background the lowest possible and most stable in time. The required orbital lifetime is three years. Bubble memories will provide 250 Mbits on board storage allowing an average data accumulation rate between successive transits over a single ground station of 40 Kbits/sec. Maximum accumulation rates of about 250 Kbits/sec will be available.

N80-22194/8 PC **A03/MF A01**
European Space Agency, Paris (France).
A Fast, Wide-Angle Telescope on Spacelab: Space Schmidt. An Assessment Study.
Oct 79, 40p ESA-SCI(79)5

A fast, wide angle telescope which will be operated from a Spacelab pallet on the space shuttle and will be capable of imaging to the darker night sky limit and in the ultraviolet wavelength range available from above the Earth's atmosphere is described. The scientific functions and possible missions for the telescope, such as studied of the UV morphology of galaxies, the detection of galactic and extragalactic hidden hot sources, and mapping the dust component of the Milky Way and external galaxies, are analyzed. The design of the telescope is discussed and its integration into the Spacelab systems is examined.

N80-22195/5 PC **A03/MF A01**
European Space Agency, Paris (France).
Infrared Space Observation (ISO): Assessment Study.
Oct 79, 49p ESA-SCI(79)6

ISO scientific objectives and program implementation are discussed. ISO comprises a cooled 60 cm diameter telescope in a 3-axis stabilized spacecraft which can be pointed within a 6 arcsec accuracy. The telescope and scientific instruments are cooled by helium gas from a cryostat containing initially 135 kg of superfluid helium. A number of instruments can be accommodated, consistent with the concept of an IR astronomy observatory. A model payload has been considered, which consists of a near IR imaging camera (1-5 micrometers), a dual range single drive Michelson inteferometer of high resolution, (2-25 micrometers). The planned ISOmission lifetime of 1 1/2 years enables it to be used for the study of a whole range of astrophysical objects at an unequalled sensitivity.

N80-22196/3 PC **A04/MF A01**
European Space Agency, Paris (France).
Polar Orbiting Lunar Observatory (POLO). Assessment Study.
Oct 79, 51p ESA-SCI(79)7

The specific scientific objectives of POLO are described and the experimental techniques required to meet these objectives are discussed. A basic payload for the orbiter is proposed. Tracking of the orbiter and the Relay and 'bent-pipe' tracking of the orbiter via the Relay as well as additional objectives, not necessarily related to lunar science, are also discussed. It is shown that the orbital requirements of the mission can be satisfied by means of an Ariane I launcher with a 4th stage. In order to satisfy the pointing requirements of the payload, a 3-axis stabilized orbiter is required. Subsystem concepts, making extensive use of design inheritance from current and future projects are presented. It is shown that a relatively simple spin-stabilized Relay spacecraft with conventional subsystems is adequate to support the tracking and payload requirements. It is proposed to use ground stations at Kourou and Odenwald for tracking and data acquisition. The state of development of the required scientific instruments is discussed, and technical management and schedule aspects are outlined.

N80-22197/1 PC **A02/MF A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Helium Synthesis, Neutrino Flavors, and Cosmological Implications.
F. W. Stecker. Dec 79, 14p NASA-TM-80604

The problem of the production of helium in big bang cosmology is re-examined in the light of several recent astrophysical observations. These data, and theoretical particle physics considerations, lead to some important inconsistencies in the standard big bang model and suggest that a more complicated picture is needed. Thus, recent constraints on the number of neutrino flavors, as well as constraints on the mean density (openness) of the universe, need not be valid.

N80-22199/7 PC **A02/MF A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Voyager Detection of Nonthermal Radio Emission from Saturn.
M. L. Kaiser, M. D. Desch, J. W. Warwick, and J. B. Pearce. Mar 80, 15p NASA-TM-80665

The detection of bursts of nonthermal radio noise from Saturn by the planetary radio astonomy experiment onboard the Voyager spacecraft is discussed. The emissions occur near 200 kHz with a peak flux density comparable to higher frequency Jovian emissions. The radiation is right-hand polarized and is most likely emitted in the extraordinary magnetoionic mode from Saturn's northern hemisphere. Modulation is apparent in the data which is consistent with a planetary rotation period of 10 hr 39.9 min.

N80-22221/9 PC **A02/MF A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Magnetic Clouds in the Solar Wind.
L. F. Burlaga, and L. Klein. Mar 80, 17p NASA-TM-80668
Submitted for Publication.

Two interplanetary magnetic clouds, characterized by anomalous magnetic field directions and unusually high magnetic field strengths with a scale of the order of 0.25 AU, are identified and described. As the clouds moved past a spacecraft located in the solar wind near Earth, the magnetic field direction changed by rotating approximately 180 deg nearly parallel to a plane which was essentially perpendicular to the ecliptic. The configuration of the magnetic field in the clouds might be that of a tightly wound cylindrical helix or a series of closed circular loops. One of the magnetic clouds was in a cold stream preceded by a shock, and it caused both a geomagnetic storm and a depression in the galactic cosmic ray intensity. No stream, geomagnetic storm, or large cosmic ray decrease was associated with the other magnetic cloud.

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A083 064/6 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Infrared Spectral Radiance of the Sky,
W. Tam, and R. Corriveau. 13 Aug 75, 6p
Availability: Pub. in Infrared Physics, v16 p129-134 1976 (No copies furnished by DTIC).

No abstract available.

AD-A083 139/6 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
A Method for Direct Determination of Real Height from Virtual Height Data for the Auroral Region of the Ionosphere.
Environmental research papers,
Milton M. Klein. 14 Nov 79, 20p Rept nos. AFGL-TR-79-0276, AFGL-ERP-684

As part of an effort to determine electron density profiles in the auroral region of the ionosphere, a method has been developed for directly calculating real height from virtual height data obtained at high latitudes. The essential ingredient of the method is the representation of the curved portion of the ordinary ray dispersion curve by an analytic form which reduces the virtual height - real height integral relation to a form of Abel's integral equation. Numerical checks indicate that the present method gives an accurate representation of the dispersion curve. The correctness of the present procedure has been verified for the case of a linear electron density profile. The present method will be applied to the numerical calculation of real height electron density profiles in the auroral region from virtual height data. The accuracy and convenience of the present method will be assessed by comparison of the results with those obtained from standard programs. (Author)

AD-A083 140/4 PC **A06/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
Microphysical Properties of a Large Scale Cloud System, 1-3 March 1978.
Environmental research papers,
Donald J. Varley. 7 Jan 80, 101p Rept nos. AFGL-TR-80-0002, AFGL-ERP-690

This report describes the microphysical properties observed by a specially-instrumented C-130 while flying in portions of a large cloud system on 3 successive days in March 1978. Each of the flights was made slightly east of an upper level trough as it moved across the U.S. Horizontal sampling passes of 50 to 100 nm (93 to 186 km) in length were made at various levels from approximately 2 to 9 km above ground in portions of the cloud system that were relatively homogeneous horizontally and vertically. Particle spectra data from PMS 1-D spectrometers were averaged for consecutive 20-sec periods. On each of the 3 days the particles having the smallest mean size were observed at the highest levels flown and had median diameters near 100 micrometers. The calculated equivalent liquid water content from 7 to 9 km was near 0.0 1 g cu m. The total particle count was between 8,000

and 18,000 cu m over Arkansas and coastal Delaware, but was near 25,000 cu m over the mountains of New Mexico. Values of mass and particle size increased with particle distance fallen, indicating growth by collective means. The largest equivalent liquid water content values were near 1 g cu m and were recorded in the large snow just above the freezing level. The form factor, a mathematical parameter, was found useful in studying particle spectra. Certain maxima and minima observed in several plotted spectra, especially those from 7-km altitude data, are suggested as being due to an aggregation mechanism. (Author)

AD-A083 151/1 Not available NTIS
Stanford Univ CA Inst for Plasma Research
Variation with Time of a Sun-Weather Effect,
J. M. Wilcox, and P. H. Scherrer. 1979, 3p
Contracts N00014-76-C-0207, NAS5-24420
Sponsored in part by Grants NGR-05-020-559 and NSF-ATM77-20580.
Availability: Pub. in Nature,v280 n5725p845-846, 30 Aug 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 154/5 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
The Dynamics of Equatorial Irregularity Patch Formation, Motion, and Decay,
J. Aarons, J. P. Mullen, H. E. Whitney, and E. M. MacKenzie. 11 Apr 79, 13p Rept no. AFGL-TR-80-0090
Pub. in Jnl. of Geophysical Research, v85 nA1 p139-149, Jan 80.

No abstract available.

AD-A083 227/9 PC **A04/MF A01**
Phoenix Corp McLean VA
An Overview of the External Magnetic Field with Regard to Magnetic Surveys.
Interim rept. May-Oct 79,
Robert D. Regan, and Paul Rodriguez. 1 Oct 79, 72p
Contract N00014-79-C-0409

This report sponsored by the Earth Physics Program of the Office of Naval Research, is an attempt to bring together in a coherent manner, for those involved in magnetic surveys, the relevant aspects of the external geomagnetic field. Although there are several excellent introductory texts on geomagnetism that treat much of this subject (most notably, Sugiura and Heppner, 1968; and Knecht, 1972) it was thought that there was a need to condense and present this and other supportive material in a form that would be more applicable to the objectives of magnetic surveys, as there is considerable interest in correcting magnetic surveys for the effects of the external field. Such efforts must start with a sufficiently detailed understanding of the geomagnetic environment in which magnetic survey data are collected and particularly of the various external field sources. Hopefully this report will serve to provide such an understanding. (Author)

AD-A083 333/5 PC **A03/MF A01**
SRI International Menlo Park CA
Effects of Impulsive Heating Events on F-Region Chemistry and Electron Density. HAES Report Number 81.
Topical rept. Mar 78-Jul 79,
John D. Kelly. 31 Jul 79, 41p DNA-5028T, AD-E300 727
Contract DNA001-77-C-0042

The Chatanika incoherent-scatter radar (located near Fairbanks, Alaska, L = 5.6) has been used to study the ionospheric effects of impulsive auroral heating events. In some cases, the time-integrated auroral energy deposition is similar in magnitude to that expected from a high altitude nuclear event outside the fireball region. The resulting ionospheric effects are significant. The elevated temperatures and atmospheric heave contribute to a substantial change in F-region ion chemistry, changing the dominant F-region ion from atomic to molecular species. As a result, a significant depletion of the F-region electron density occurs. Currently, these effects are not accurately predicted by the nuclear codes, as the function of the codes is to predict the large-scale perturbations. The Chatanika radar data can be used to improve the ambient ionospheric models and to improve the predictions of F-region changes resulting from sudden heating events.

AD-A083 393/9 PC **A03/MF A01**
Naval Research Lab Washington DC
Nonlinear Equatorial Spread F: Spatially Large Bubbles Resulting from Large Horizontal Scale Initial Perturbations.
Memorandum rept.,
S. T. Zalesak, and S. L. Ossakow. 6 Feb 80, 44p NRL-MR-4154, AD-E000 391

Motivated by the observations of large horizontal scale length equatorial spread F 'bubbles', we have performed numerical simulations of the nonlinear evolution of the collisional Rayleigh-Taylor instability in the nighttime equatorial ionosphere, using large horizontal scale length initial perturbations. The calculations were performed using a new, improved numerical code which utilizes the recently developed, fully multidimensional flux-corrected transport (FCT) techniques. We find that large horizontal scale initial perturbations evolve nonlinearly into equally large horizontal scale spread F bubbles, on a time scale as fast as that of the corresponding small horizontal scale length perturbations previously used. Further, we find the level of plasma depletion inside the large scale bubbles to be appreciably higher than that of the smaller scale bubbles, approaching 100%, in substantial agreement with the observations. This level of depletion is due to the fact that the plasma comprising the large scale bubbles has its origin at much lower altitudes than that comprising the smaller scale bubbles. Analysis of the polarization electric fields produced by the vertically aligned ionospheric irregularities show this effect to be due to fringe fields similar in structure to those produced at the edge of a parallel plate capacitor.

AD-A083 459/8 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
The Photolysis of Ozone A253.7 nm: Deactivation of Atomic Oxygen and of Diatomic Oxygen Molecule by the Gases of the Atmosphere,
Michel J. E. Gauthier, and David R. Snelling. 9 Sep 74, 25p DRB-REPRINT-4115
Text in French; summary in English.
Availability: Pub. in Jnl. of Photochemistry, v4 p27-50 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 475/4 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
Occurrence and Lifetimes of Discrete Auroras near Midnight,
A. P. Krukonis, and J. A. Whalen. 9 Jan 79, 13p Rept no. AFGL-TR-80-0062
Pub. in Jnl. of Geophysical Research, v85 nA1 p119-129, 1 Jan 80.

No abstract available.

AD-A083 537/1 PC **A03/MF A01**
Foreign Technology Div Wright-Patterson AFB OH
Spectrophotometric Studies of Atmospheric Aerosol Characteristics in Various Geographic Regions of the USSR,
G. P. Gushchin. 30 Apr 79, 27p Rept no. FTD-ID(RS)T-0427-79
Edited trans. of Trudy Glavnaya Geofizicheskaya Observatoriya im. A. I. Voyeykova (USSR) Issue 223 p65-80 1968, by Bernard L. Tauber.

No abstract available.

AD-A083 550/4 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
A Discussion of Arctic Ionograms.
Interim rept.,
R. A. Wagner, and C. P. Pike. 14 Apr 80, 23p Rept no. AFGL-TR-80-0120
Presented at the AGARD Technical Meeting in Lindau/Harz, German, Sep 71.

Example of arctic ionogram sequences, recorded on the AFCRL Flying Ionospheric Laboratory, are presented. The purpose of this paper is to show that: (a) ionogram sequences, recorded on arctic flights, facilitate the interpretation of oblique incidence echoes from E- and F-layer heights, (b) parameters of the arctic ionosphere can be mapped by using the 'auroral oval' as an ordering system, (c) vertical and oblique incidence echoes, appearing on ground station ionograms, can be interpreted in terms of the station's position relative to the auroral oval. The analysis of a three hour flight with 6 latitudinal scans underneath an auroral band shows the close relationship between auroral sporadic E echoes (Esa) and discrete aurora. The investigation of 49 latitudinal scans through the auroral oval during times of low magnetic activity revealed the existence of a particle produced E layer which is oval aligned, is 2 deg to 6 deg wide in corrected geomagnetic latitude and occurs at all corrected geomagnetic times. This layer produces the night E echoes. A new ionogram analysis procedure, which uses oblique incidence F-layer echoes, is demonstrated, and the feasibility of monitoring the latitude of the southern edge of the polar F-layer irregularity zone by using this new analysis procedure is demonstrated. (Author)

AD-A083 581/9 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
A Comparison of the North- and South-Polar F Layers,
C. P. Pike. 28 Dec 70, 10p Rept no. AFGL-TR-80-0122
Pub. in Jnl. of Geophysical Research, v76 n28 p6875-6882, 1 Oct 71.

No abstract available.

AD-A083 584/3 PC **A02/MF A01**
Air Force Geophysics Lab Hanscom AFB MA
Seasonal Variation of Equatorial Spread F in the American and Indian Zones,
R. G. Rastogi. 10 Jul 79, 7p Rept no. AFGL-TR-80-0101
Pub. in Jnl. of Geophysical Research, v85 nA2 p722-726, 1 Feb 80.

No abstract available.

AD-A083 586/8 PC **A02/MF A01**
Boston Coll Chestnut Hill MA Dept of Physics
The Longitudinal Distribution of Equatorial Spread F Plasma Bubbles in the Topside Ionosphere,
William J. Burke, Delia E. Donatelli, and Rita C. Sagalyn. 22 Feb 79, 8p AFGL-TR-80-0126
Contract F19628-79-C-0037
Prepared in cooperation with Regis Coll., Weston, MD, under Contract F19628-76-C-0255. Pub. in Jnl. of Geophysical Research, v85 nA3 p1335-1340, 1 Mar 80.

No abstract available.

AD-A083 615/5 PC **A02/MF A01**
Washington Univ Seattle Dept of Electrical Engineering
Multiple Scattering Effects on Transmission through the Atmosphere.
Annual summary rept. 1 Sep 79-31 Aug 80,
Akira Ishimaru. Apr 80, 7p
Contract N00014-78-C-0723

The work is directed to the investigation of the transmission characteristics of optical waves with wavelengths in the range of 1-15 micrometers through various atmospheric conditions including clouds, fog, turbulence, rain, hail, snow, and inhomogeneous layers. Progress was made in the areas of plane wave solution, beam wave solution, and pulse wave solution of the optical transmission characteristics through fog.

N80-21407/5 PC **A03/MF A01**
European Space Agency, Paris (France).
GEOS 3: Report on the Phase-A Study.
Dec 79, 43p ESA-SCI(79)12

A European mission into the distant geomagnetic tail of the Earth is outlined. The mission can be realized comparatively quickly and inexpensively because it is based on existing hardware and designs from the GEOS program. Three major exceptions are the propulsion system, which is taken from the SYMPHONIE program, part of the attitude-measuring subsystem, and the telecommunications subsystem. Although the experiment sensors will have to be modified or even completely

redesigned to operate in the far tail, it will be possible to maintain the existing spacecraft interfaces for power, telemetry, telecommand, booms, etc. The GEOS spacecraft design has sufficient flexibility to allow an open announcement of opportunity. Like its prodecessors, GEOS-3 will be placed initially into a geostationary transfer orbit; its mass and dimensions being compatible with an Ariane double launch. The SYMPHONIE motor will then be used to inject the satellite into its final deep-tail orbit. The apogee of this orbit, which can be as much as 1.5 million km from Earth, will be kept in the tail by means of regular lunar flyby or by placing the spacecraft into an orbit about the antisunward Lagrangian point L2.

N80-21916/5 PC **A05**/MF **A01**
Old Dominion Univ. Research Foundation, Norfolk, VA.
Ground Temperature Measurement by PRT-5 for Maps Experiment.
Final Report.
S. K. Gupta, and S. N. Tiwari. Apr 78, 89p NASA-CR-158966
Grant NSG-1282

A simple algorithm and computer program were developed for determining the actual surface temperature from the effective brightness temperature as measured remotely by a radiation thermometer called PRT-5. This procedure allows the computation of atmospheric correction to the effective brightness temperature without performing detailed radiative transfer calculations. Model radiative transfer calculations were performed to compute atmospheric corrections for several values of the surface and atmospheric parameters individually and in combination. Polynomial regressions were performed between the magnitudes or deviations of these parameters and the corresponding computed corrections to establish simple analytical relations between them. Analytical relations were also developed to represent combined correction for simultaneous variation of parameters in terms of their individual corrections.

PB80-174873 PC **A09**/MF **A01**
Dames and Moore, Bethesda, MD.
Summary Report of the NCAQ Atmospheric Dispersion Modeling Panel. Volume 2. Background and Supporting Material.
Final rept.,
M. W. Chandler, J. Lewis, B. Zaicman, J. I. Kelly, and A. E. Nugent. Mar 80, 188p AQ-7379-2
See also Volume 1, PB80-174964. Panel Meeting Held in Reston, Virginia, November 13-16, 1979.

This is volume 2 of a two-volume report of a 22-member Atmospheric Dispersion Modeling Panel convened by the National Commission on Air Quality to provide guidance on: (1) uses and limitations of currently available models for air quality management; and, (2) appropriate dispersion models and/or technical approaches to be considered in the Commission's evaluation of the Clean Air Act through five comprehensive regional studies (Los Angeles area, Four Corners area, Minneapolis/St. Paul area, New York/Hartford, CT. area, and the Ohio River Valley from Louisville to Cincinnati). Volume 2 contains background and supporting material provided to Panel participants.

PB80-176787 PC **A13**/MF **A01**
Ohio State Univ., Columbus. Dept. of Chemistry.
Kinetic Studies of Simulated Polluted Atmospheres.
Final rept. Jan 76-Apr 79,
Jack G. Calvert. Jan 80, 281p EPA-600/2-80-024
Contract EPA-R-804348-01

The kinetics and reaction mechanisms of several important atmospheric contaminants - SO2, formaldehyde, nitrous acid, and the nitrosamines - were assessed to help quantify some key aspects of the chemistry of polluted atmospheres. The reactions and lifetimes of excited sulfur dioxide with various atmospheric components including hydroxyl, hydroperoxy, and methylperoxy radicals were studied. These data and other published rate data were reviewed and evaluated. The photolysis of formaldehyde was investigated as a major source of hydroperoxyl radicals, and a quantitative evaluation made of its apparent first order rate constants at various solar zenith angles. The absolute extinction coefficients for nitrous acid were determined, and estimates made of the rates of hydroxyl radical generation in the troposphere by photolysis of nitrous acid. Long path Fourier transform infrared spectroscopy was used to help evaluate the potential for nitrosamine formation in the polluted atmosphere.

PB80-178346 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Evaluation of the Real-Time Air-Quality Model Using the RAPS (Regional Air Pollution Study) Data Base. Volume 1. Overview.
Final rept. Aug 77-Apr 79,
Ronald E. Ruff. Feb 80, 30p 6868-FR-VOL-1, EPA-600/4-80-013A
Contract EPA-68-02-2770
See also Volume 2, PB80-178353.
Also available in set of 4 reports PC E12, PB80-178338.

The theory and programming of statistical tests for evaluating the Real-Time Air-Quality Model (RAM) using the Regional Air Pollution Study (RAPS) data base are fully documented in four report volumes. Moreover, the tests are generally applicable to other model evaluation problems. Volume 1 presents an overview of the tests, displays, software, and application of the resulting statistical package.

PB80-178353 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Evaluation of the Real-Time Air-Quality Model Using the RAPS (Regional Air Pollution Study) Data Base. Volume 2. Statistical Procedures.
Final rept. Aug 77-Apr 79,
Harold S. Javitz, and Ronald E. Ruff. Feb 80, 57p 6868-FR-VOL-2
Contract EPA-68-02-2770
See also Volume 1, PB80-178346 and Volume 3, PB80-178361.
Also available in set of 4 reports PC E12, PB80-178338.

The theory and programming of statistical tests for evaluating the Real-Time Air-Quality Model (RAM) using the Regional Air Pollution Study (RAPS) data base are fully documented in four volumes. Moreover, the tests are generally applicable to other model evaluation problems. Volume 2 presents the tests considered for evaluating air-quality simulation models in general and those that would be useful in evaluating the RAM. The capability of the RAM to predict sulfur dioxide (SO2) concentrations was of particular interest. Specific tests for both intermediate and final evaluations are recommended, with accompanying descriptions of formats, plots, and procedures to establish confidence limits. Discussion focuses on the mathematics, procedures, and interpretation of the individual tests; their relevance to the project objectives; and possible trade-offs among tests.

PB80-178361 PC **A07**/MF **A01**
SRI International, Menlo Park, CA.
Evaluation of the Real-Time Air-Quality Model Using the RAPS (Regional Air Pollution Study) Data Base. Volume 3. Program User's Guide.
Final rept. Aug 77-Apr 79,
Ronald E. Ruff, Hisao Shigeishi, and Rodney H. Allen. Feb 80, 141p 6868-FR-VOL-3, EPA-600/4-80-013C
Contract EPA-68-02-2770
See also Volume 2, PB80-178353 and Volume 4, PB80-178379. Prepared in cooperation with Comp-Aid, Inc., Research Triangle Park, NC.
Also available in set of 4 reports PC E12, PB80-178338.

The theory and programming of statistical tests for evaluating the Real-Time Air-Quality Model (RAM) using the Regional Air Pollution Study (RAPS) data base are fully documented in four volumes. Moreover, the tests are generally applicable to other model evaluation problems. Volume 3 presents the software used in the statistical tests for evaluating the RAM. Six statistical tests are described, with attention to the programming philosophy behind them. Also presented is a review of the auxiliary software that sort, retrieve, format, and display the data.

PB80-178379 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Evaluation of the Real-Time Air-Quality Model Using the RAPS (Regional Air Pollution Study) Data Base. Volume 4. Evaluation Guide.
Final rept. Aug 77-Apr 79,
Ronald E. Ruff. Feb 80, 59p 6868-FR-VOL-4, EPA-600/4-80-013D
Contract EPA-68-02-2770
See also Volume 3, PB80-178361.
Also available in set of 4 reports PC E12, PB80-178338.

The theory and programming of statistical tests for evaluating the Real-Time Air-Quality Model (RAM) using the Regional Air Pollution Study (RAPS) data base are fully documented in four volumes. Moreover, the tests are generally applicable to other model evaluation problems. Volume 4 discusses the application and interpretation of the statistical programs, particularly with regard to use on the RAM. In general, there is no set procedure for evaluating an air-quality model because of the different reasons for evaluating models and many subjective decisions to be made during the process. However, guidelines are presented to cover a wide variety of evaluation needs, with attention to data preparation, classification, analysis, selection and application of tests, and interpretation of results. Several methods of diagnosing causes of poor model performance are discussed and some sample program outputs are also provided.

PB80-183361 PC **A99**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Space Environment Lab.
Solar-Terrestrial Predictions Proceedings. Volume II. Working Group Reports and Reviews,
Richard F. Donnelly. Dec 79, 747p NOAA-80040404
See also Volume 1, PB80-134588. Workshop held April 13-17, 1979 at Boulder, CO.

Volume 2 of these Proceedings presents the main results of the workshop and the recommendations of the working groups. Three types of papers are included: (1) working group reports; (2) topical review papers; and (3) reviews of the needs for predictions by groups that use solar-terrestrial predictions. Volume 2 strongly emphasizes predictions for satellite and power-system applications because of their increasing importance. Chapter I discusses in depth the solar-terrestrial environment problems for spacecraft. Chapter II discusses the needs for solar-terrestrial predictions. Chapter III discusses radio communication predictions. Chapter IV discusses solar-activity predictions. Chapter V discusses predictions of magnetospheric disturbances including solar-wind and magnetosphere interactions. Chapter VI discusses ionospheric predictions. The final chapter discusses the potential for predicting climate or weather effects of solar activity.

UHMET-79-04 PC **A04**/MF **A01**
Hawaii Univ., Honolulu. Dept. of Meteorology.
Project Ahupua'a: Solar Meteorological Field Measurements on the Island of Hawaii, Summer 1978. 2. Eastern Flank of Mauna Loa.
P. C. Ekern, and A. J. Garrett. Aug 79, 63p
Contract EG-77-G-03-1617

During 1-11 June 1978, solar radiation and other meteorological data were gathered at eight stations in a nearly linear transect on the windward eastern slopes of Hawaii, extending from the coast of Hilo, Hawaii to Mauna Loa Observatory (MLO), 60 km inland and 3400 m higher. In general, synoptic conditions were representative of normal early summer trade wind weather with a frontal remnant to the north, and a small westward-moving depression to the south. Solar radiation distributions followed climatological rainfall patterns; the driest areas were sunniest. At the wettest sites, underneath the orographic cloud, measured global solar radiation was only 50% of clear-sky potential, and the diffuse component probably accounted for more than 50% of the global. Consequently, effective concentration of solar radiation for use as an alternate energy resource will be difficult in such areas. The orographic cloud developed during the day in anabatic/trade winds of 2 to 4 m s exp -1 , which sharply reduced afternoon solar radiation at all sites, including MLO on 7 out of 11 days. Moist upslope flow penetrated the trade wind inversion by 0.5 to 1.5 km on weak in-

version days (approx. +1 exp 0 C). When the inversion was strong (+5 to +8 exp 0 C), MLO was dry and clear all day. Cloudiness, and hence insolation, varied greatly from day-to-day due to passage of trade wind cloud masses and jet stream cirrus. Even so, the island effect was always significant. Thus, our data and analyses can be used by mesoscale numerical modelers, particularly those attempting to simulate orographic cloud development. (ERA citation 05:013236)

4B. Meteorology

AD-A083 071/1 PC **A03**/MF **A01**
Environmental Research and Technology Inc Concord MA
Assessment of Radar Parameters for Hydrometeor Scatter Measurement Using the ALCOR and TRADEX Radars at Kwajalein,
David W. Blood, and Robert K. Crane. Nov 79, 27p ERT-P-3750-TR-79, SCIENTIFIC-1, AFGL-TR-80-0031
Contract F19628-79-C-0007

this report documents the scattering relationships and radar parameters which enter into the measurement of effective radar reflectivity, Z(e), obtained from the ALCOR (C-band) and TRADEX (S-band) radars operated at Kwajalein Atoll for hydrometeor scatter investigations. An assessment is given of the calibration procedures used for the radars including assumptions, corrections, and uncertainties associated with the parameters used in the measurements. The current best estimate radar constants for ice and water used for data processing are documented for users of the data together with an editing criteria for rain data, based upon the principal-to-opposite polarization received power ratios. The study program for AFGL is supported under Contract F19628-79-C-0007 for assessing the errors associated with the measurement of reentry environmental conditions for U.S. Air Force programs at the Kwajalein Missile Range. (Author)

AD-A083 099/2 PC **A05**/MF **A01**
Air Force Global Weather Central Offutt AFB NE
Clear Air Turbulence Forecasting Techniques.
Technical note,
David R. Lee, Roland B. Stull, and William S. Irvine. Dec 79, 81p Rept no. AFGWC/TN-79/001 Supersedes Rept. no. AFGWC-TM-70-7 dated 15 Dec 70, AD-731 134.

This technical note is a compilation of the latest clear air turbulence (CAT) forecasting techniques used by AFGWC forecasters. It is a comprehensive treatment of a complex and unique forecasting subject. The methods are relatively easy to follow and are a step-by-step approach to forecasting this weather phenomenon. This document replaces AFGWC Tech Memo 70-7 'Turbulence Forecasting Procedures' by Capt Paul T. Burnett, 15 Dec 70. Over the past nine years the automated CAT routines have been totally replaced. Also, synoptic rules of thumb and model relationships are now better understood and documented. (Author)

AD-A083 125/5 MF **A01**
Air Force Global Weather Central Offutt AFB NE
Training Guide for Severe Weather Forecasters,
Charlie A. Crisp. Nov 79, 82p Rept no. AFGWC/TN-79/002
Availability: Microfiche copies only.

Presented here is a formal and detailed training guide designed for a forecaster's initial exposure to the Air Force Global Weather Central's (AFGWC) severe weather function. This TN details the analysis procedures for all charts and prognostic tools available to the severe weather function. Significant severe weather parameters are analyzed at the surface 850 mb, 700 mb, and 500 mb levels. Additionally, the 850/500 mb thickness and maximum wind charts are examined. Also discussed are the severe weather parameters chart and the 12-hour surface pressure change chart. A detailed, step-by-step evaluation of a synoptic situation is presented along with appropriate forecasts and verification data. Finally, the automated prognoses available at AFGWC are discussed in relation to severe weather forecasting. Prior to using this guide, forecasters should become familiar with AWSTR 200 (Rev), 'Note on Analysis and Severe Storm Forecasting of the Air Force Global Weather Central'. AWSTR 200 (Rev) is referred to briefly when relating analyzed parameters to those synoptic patterns producing severe thunderstorms and tornadoes. This TN will familiarize field users with the techniques used to produce the Military Weather Advisory (MWA). (Author)

AD-A083 157/8 PC **A04**/MF **A01**
Air Force Global Weather Central Offutt AFB NE
The AFGWC Automated Analysis/Forecast Model System.
Technical note,
Terry C. Tarbell, and James E. Hoke. Dec 79, 59p Rept no. AFGWC/TN-79/004

This technical note (TN) describes the automated analysis/forecast model system that currently exists at the Air Force Global Weather Central (AFGWC). The emphasis will be on the interrelation and ing of the various analysis/forecast models in the production cycle. This description of the automated analysis/forecast system was written for managers, programmers, computer operations personnel, users of the ultimate products, and the meteorological community at large. This TN will only address analysis/forecast models that are the primary meteorological data-base builders. Most applications programs that access the data bases are therefore not included.

AD-A083 158/6 PC **A04**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Marine Boundary Layer Sampling, Flight Number 2.
Environmental research papers,
Ian D. Cohen. 11 Oct 79, 73p Rept nos. AFGL-TR-79-0242, AFGL-ERP-678
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. See also Rept. no. AFGL-TR-79-0013, AD-A069 723.

On 22 March 1979, an instrumented MC-130E for cloud physics measurements by AFGL made a series of 8-min sampling passes at altitudes ranging from 100 to 1000 ft above the ocean surface off the coast of Washington. The flight profile was similar to that flown by the same aircraft on 10 July 1978 off the coast of California (AFGL-TR-79-0013). Winds were light, and the visibility generally was 7 miles or greater. Varying numbers of particles were detected in the 2 to 22 micrometer range at all levels. The number of particules was fairly constant with altitude; liquid water content (LWC) was about 0.001 g/cu m at all levels. This was in contrast to the 10 July 1978 flight, where LWC varied much more, both with height and location. The differences between the two flights are attributed to the lower windspeeds and the resultant fewer whitecaps observed on this second flight. (Author)

AD-A083 236/0 PC **A03**/MF **A01**
Meteorology International Inc Monterey CA
The Verification of Fields Based on Comparison with Concurrent Observations: The OPL2X Capability.
Final rept.,
Manfred M. Holl, and Michael J. Cuming. Jan 80, 50p Rept no. MII-M-245-08
Contract N00228-79-D-9689

No abstract available.

AD-A083 303/8 MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Seymour-Johnson AFB, Goldsboro, North Carolina. Revised Uniform Summary of Surface Weather Observations (RUSSWO).
Final rept.
31 Mar 80, 460p Rept no. USAFETAC/DS-80/030
Supersedes rept. no. USAFETAC/DS-79-044 dated 31 Jul 72, AD-A074 670.
Availability: Microfiche copies only.

This report is a six-part statistical summary of surface weather observations for Seymour-Johnson AFB, Goldsboro, North Carolina. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A083 304/6 MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Sachon AFS K-4, Sacheon, Korea. Revised Uniform Summary of Surface Weather Observations (RUSSWO).
Final rept.
11 Apr 68, 304p Rept no. USAFETAC/DS-80/031
Availability: Document partially illegible.

This report is a six-part statistical summary of surface weather observations for Sachon AFS K-4, Sacheon, Korea. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A083 305/3 PC **A13**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Pusan East AFS K-9, Pusan, Korea. Revised Uniform Summary of Surface Weather Observations (RUSSWO).
Final rept.
26 Feb 68, 298p Rept no. USAFETAC/DS-80/032

This report is a six-part statistical summary of surface weather observations for Pusan East AFS K-9, Pusan, Korea. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A083 306/1 PC **A16**/MF **A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Bad Kreuznach AAF, Bad Kreuznach, Germany Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
9 Mar 72, 365p Rept no. USAFETAC/DS-80/039

This report is a six-part statistical summary of surface weather observations for Bad Kreuznach AAF, Bad Kreuznach, Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky

Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A083 307/9 PC **A15/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Baumholder AAF, Saarbrucken, Germany Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
7 Feb 72, 348p Rept no. USAFETAC/DS-80/034

This report is a six-part statistical summary of surface weather observations for Baumholder AAF, Saarbrucken, Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A083 308/7 PC **A17/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Bad Tolz AAF, Bad Tolz, Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
26 Jan 72, 390p Rept no. USAFETAC/DS-80/035

This report is a six-part statistical summary of surface weather observations for Bad Tolz AAF, Bad Tolz, Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A083 309/5 PC **A18/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Ansbach AAF, Katterback, Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
29 Oct 74, 409p Rept no. USAFETAC/DS-80/036

This report is a six-part statistical summary of surface weather observations for Ansbach AAF, Katterbach, Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A083 310/3 PC **A18/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Feucht AAF, Nurnberg, Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
13 Nov 74, 414p Rept no. USAFETAC/DS-80/037

This report is a six-part statistical summary of surface weather observations for Feucht AAF, Nurnberg, Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A083 311/1 PC **A19/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Erding AS, Munchen, Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO).
Final rept.
22 Oct 71, 426p Rept no. USAFETAC/DS-80/038

This report is a six-part statistical summary of surface weather observations for Erding AS, Munchen, Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A083 312/9 PC **A18/MF A01**
Air Force Environmental Technical Applications Center Scott AFB IL
Fulda AAF, Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F.
Final rept.
8 Feb 72, 416p Rept no. USAFETAC/DS-80/039

This report is a six-part statistical summary of surface weather observations for Fulda AAF, Fulda, Germany. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling Versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew-point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurrence tables. (Author)

AD-A083 353/3 PC **A02/MF A01**
Weather Wing (1st) Hickam AFB HI
United States Air Force WC-130 Weather Reconnaissance.
Journal article,
R. S. Henderson. 1980, 8p
Pub. in WMO Bulletin, p10-16 Jan 80.

No abstract available.

AD-A083 482/0 PC **A03/MF A01**
Foreign Technology Div Wright-Patterson AFB OH
Geometric Methods of Processing Television Images of the Cloud Cover of the Earth,
K. S. Shifrin, and Yu. S. Fridman. 6 Nov 79, 49p Rept no. FTD-ID(RS)T-1407-79
Unedited machine trans. of Trudy Glavnoy Geofizicheskoy Observatorii (USSR) n235 p24-42 1970.

No abstract available.

AD-A083 564/5 PC **A02/MF A01**
Weather Wing (3rd) Offutt AFB NE
The Cheyenne Tornado; A METSAT Case Study,
James C. St. John. 27 Mar 80, 13p Rept no. 3WW/TN-80/003

This Technical Note describes the Meteorological Satellite (METSAT) imagery of the thunderstorm outbreak which produced the 16 July 1979 Cheyenne, Wyoming tornado. It discusses METSAT imagery signatures for severe weather and the application of METSAT Imagery in providing weather support to certain Air Force operations. (Author)

AD-A083 572/8 PC **A02/MF A01**
Stanford Univ CA Inst for Plasma Research
On the Nature of the Apparent Response of the Vorticity Area Index to the Solar Magnetic Field.
Scientific rept.,
J. M. Wilcox, and P. H. Scherrer. Mar 80, 23p Rept no. SU-IPR-802
Contracts N00014-76-C-0207, NAS5-24420
Sponsored in part by Grants NGR-05-020-559 and NSF-ATM77-20580.

The apparent response of the vorticity area index to the solar magnetic field is confined to tropospheric regions of intense circulation. Discussions and calculations that include larger volumes of the troposphere would not be expected to show a significant sun-weather effect. Analysis of the effect in time intervals outside the original 1963-73 is also discussed. An assessment of this sun-weather effect at the present time is given. (Author)

AD-A083 580/1 Not available NTIS
University Coll London (England) Dept of Physics and Astronomy
Seasonal and Diurnal Variations of Middle Atmosphere Winds,
G. V. Groves. 1980, 22p AFGL-TR-80-0095
Grant AFOSR-77-3224
Availability: Pub. in Philosophical Transactions of the Royal Society of London, Series A, v296 p29-40 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 628/8 PC **A02/MF A01**
California Univ Berkeley Statistical Lab
Comments on the Special Issue of Communications in Statistics (Volume A8, Number 10) Concerned with Weather Modification Experiments.
Scientific rept.,
Jerzy Neyman. Nov 79, 21p ONR-79-06
Contract N00014-75-C-0159, Grant DAAG29-76-G-0167
See also AD-A073 941.

As stated by the Editors of the Special Issue, it was compiled with reference to two of my statements: (1) that much of the current weather modification

literature is slanted and unreliable, and (2) that progress in the building of a reliable weather modification technology requires an interdisciplinary study of as many completed cloud seeding experiments as possible. The material published in the Special Issue related to two completed experiments, the Tasmania and the Israeli experiments. It is shown that a realistic appraisal of a completed experiment requires a prolonged effort, including an examination of quite a few relevant publications and, on occasion, some numerical work on published raw data. It appears that an interdisciplinary reanalysis of the Tasmania experiment can contribute to the development of a reliable cloud seeding technology. (Author)

BNL-26891 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Transport and Diffusion Climatology of the US Atlantic and Gulf Coasts.
G. S. Raynor, and J. V. Hayes. 1980, 4p CONF-800107-4
Contract EY-76-C-02-0016
Conference on coastal meteorology, Los Angeles, CA, USA, 30 Jan 1980.

This study is part of a larger study of coastal meteorology and diffusion and was planned to assist in site selection of energy facilities by describing the transport and diffusion climatology of the United States east and Gulf coasts in as much detail as can be extracted from readily available meteorological data. The area covered in this study is the United States east and Gulf coasts from Maine to Texas. The region studied is all within the coastal plain and is generally characterized by flat beaches and very gentle slopes inland except in New England, where the coast is more rugged and the terrain hilly close to the sea. Meteorological variables of primary concern in this study are those which govern or influence transport and diffusion of airborne gases and particles. The most important are wind direction and speed and some measure of diffusive capacity such as turbulence, gustiness or lapse rate. Eight stations were chosen to give four pairs for comparison between a coastal station and another somewhat farther inland. The pairs are Boston and Bedford, Massachusetts; Belmar and Lakehurst, New Jersey; Cape Kennedy and Orlando, Florida; and Galveston and Houston, Texas. The same years of data were obtained for both stations in each pair. Results of selected examples are presented. The frequency of calms and of winds in the three sectors relative to the coastline is reported for the 25 coastal stations from Portland, Maine (PWM) to Brownsville, Texas (BRO). Differences between day and night in wind direction distribution are shown for six selected stations. The frequency of the five diffusion rating classes at the same coastal stations during onshore winds is also shown. Differences in diffusion conditions between day and night at six selected stations are given. The results obtained were arranged for easy use with diffusion models in which the primary meteorological inputs are wind speed and measures of lateral and vertical diffusion. (ERA citation 05:016429)

DOE/EV-0062/1 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Climate Program Plan. Volume 1 of 2.
Jan 80, 90p
Contract W-7405-ENG-48

As part of the United States Climate Program Plan developed by the Interdepartmental Committee for Atmospheric Sciences, DOE is responsible for developing an understanding of and assessment capabilities for the effects of climate and climate fluctuations on man's generation of power, the effects of power generation and its various fuel processes and/or control technologies on climate, and development of blends of power generation and distribution modes that minimize adverse environmental and climatic effects. The DOE Climate Program Plan focuses on these three major roles in basic and applied research. The purpose of this document is to present background information relevant to these roles, to identify the perceived and potential effects of energy technologies on climate that now merit assessment, to define the need for research on the prediction of weather and climate variations and assessment of their effects on power production, and to outline research goals appropriate to the DOE mission. This report focuses on the need for assessing the cycles and budgets of the entire range of substances emitted in power production by the many technologies now in use. Emissions include but are not limited to exp 85 Kr, particles, sulfur, and nitrogen oxides, waste heat, and hydrocarbons. To provide the basis for assessing the impacts of these emissions, this plan calls for specialized, mission-oriented research to improve understanding of processes that determine how these emissions are transported, transformed, and scavenged in the atmosphere, and of the natural processes that can be affectd by energy activities. This latter category includes potential modification of surface properties caused, for example, by large arrays of solar collectors, extensive biomass production, and wind power modification of the boundary layer. (ERA citation 05:016430)

NUREG/CR-1152 PC **A06**/MF **A01**
Sandia Labs., Albuquerque, NM.
Recommended Methods for Estimating Atmospheric Concentrations of Hazardous Vapors After Accidental Release Near Nuclear Reactor Sites.
Topical rept.,
J. R. Connell, and H. W. Church. Apr 80, 107p SAND-78-1879

A literature survey was done which addresses the problems of atmospheric transport and diffusion of positively and negatively buoyant hazardous gases. Typical hazardous vapors of concern are chlorine, ammonia, and vapors from liquified natural gas. The objective was to determine the state of the art for analyzing hazards to nuclear power plants. Within this report, existing models with predictive capability have been categorized, and available measurements of transport, diffusion, and gas concentration have been organized by flow condition type in order to assess model accuracy. Operational models have not been found which are entirely suitable for NRC Regulatory predictive purposes. However, suggestions are made for model selection. Recommendations are also given for further research in areas where such efforts should prove profitable.

NUREG/CR-1390 PC **A04**/MF **A01**
National Climatic Center, Asheville, NC.
Probability Estimates of Temperature Extremes for the Contiguous United States,
M. L. Nicodemus, and N. B. Guttman. May 80, 60p

Annual maximum and minimum temperature data for approximately 2000 stations are used to develop 14 selected probability estimates of annual maximum and minimum temperatures from the application of the Fisher-Tippett, Type I-extreme value model. Maps are also presented for the .5, .98 and .99 probabilities (corresponding to the 2-, 50-, and 100-year return periods) for stations with 40 years or more of data.

N80-21626/0 PC **A03**/MF **A01**
Southwest Research Inst., San Antonio, TX.
The Relationship of Storm Severity to Directionally Resolved Radio Emissions.
Final Report.
R. O. Johnson, M. L. Bushman, and W. M. Sherrill. Feb 80, 48p NASA-CR-161381
Contract NAS8-33371

Directionally resolved atmospheric radio frequency emission data were acquired from thunderstorms occurring in the central and southwestern United States. In addition, RF sferic tracking data were obtained from hurricanes and tropical depressions occurring in the Gulf of Mexico. The data were acquired using a crossed baseline phase interferometer operating at a frequency of 2.001 MHz. The received atmospherics were tested for phase linearity across the array, and azimuth/elevation angles of arrival were computed in real time. A histogram analysis of sferic burst count versus azimuth provided lines of bearing to centers of intense electrical activity. Analysis indicates a consistent capability of the phase linear direction finder to detect severe meteorological activity to distances of 2000 km from the receiving site. The technique evidences the ability to discriminate severe storms from nonsevere storms coexistent in large regional scale thunderstorm activity.

N80-21721/9 PC **A05**/MF **A01**
Lightning Technologies, Inc., Pittsfield, MA.
Calibration Tests on Magnetic Tape Lightning Current Detectors.
K. E. Crouch. Apr 80, 87p NASA-CR-3270, LT-79-51
NASA ORDER CC-82279-A

The low cost, passive, peak lightning current detector (LCD) invented at the NASA/Kennedy Space Center, uses magnetic audio recording tape to sense the magnitude of the peak magnetic field around a conductor carrying lightning currents. Test results show that the length of audio tape erased was linearly related to the peak simulated lightning currents in a round conductor. Accuracies of + or - 10% were shown for measurements made using a stopwatch readout technique to determine the amount of tape erased by the lightning current. The stopwatch technique is a simple, low cost means of obtaining LCD readouts and can be used in the field to obtain immediate results. Where more accurate data are desired, the tape is played and the output recorded on a strip chart, oscilloscope, or some other means so that measurements can be made on that recording. Conductor dimensions, tape holder dimensions, and tape formulation must also be considered to obtain a more accurate result. If the shape of the conductor is other than circular (i.e., angle, channel, H-beam), an analysis of the magnetic field is required to use an LCD, especially at low current levels.

N80-21799/5 PC **A12**/MF **A01**
European Space Agency, Paris (France).
Use of Data from Meteorological Satellites.
B. Battrick, and J. Mort. Nov 79, 263p ESA-SP-143
Partly in English and French. Proceedings of Tech. Conf., Lannion, France, 17-21 Sep. 1979; Sponsored by Esa, Soc. Meteorol. De France and Organ. Meteorol. Mondiale.

No abstract available.

N80-21892/8 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
NASA Global Atmospheric Sampling Program (GASP) Data Report for Tapes VL0011 and VL0013.
Progress Report, 10 Jan. - 2 Oct. 1977.
J. D. Holdeman, T. J. Dudzinski, and M. W. Tiefermann. Mar 79, 63p NASA-TM-81462, E-393

In-situ measurements of atmospheric ozone, carbon monoxide, clouds, and related meteorological and flight information obtained during 1122 flights of aircraft VH-EBE and N655PA from January 10 through October 2, 1977 are reported. In addition, tropopause pressures obtained from time and space interpolation of achieved data for the dates of the flights are included.

N80-21915/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
The Role of Upper Tropospheric Jet Streaks and Lee-Side Cyclogenesis in the Development of Low Level Jets in the Great Plains.
L. W. Uccellini. Mar 80, 17p NASA-TM-80653

A review of 15 cases of low level jets (LLJ) which developed in the Great Plains is presented. For 12 out of the 15 cases, a systematic upper level flow pattern was isolated which includes the existence of a trough over the southwest United States and the propagation of upper level jet streaks from the Rocky Mountains toward the Great Plains. This flow pattern is responsible for lee side cyclogenesis or lee side troughing that produces the pressure gradients needed for the development of the LLJ. For the other three cases, a blocking ridge existed over the Great Plains and the upper level flow is relatively weak. It is during these situations that the classic, diurnal oscillating LLJ was observed. A more detailed review of four cases indicates that the subsynoptic scale adjustments associated with the upper level jet streak's forcing of lee side cyclogenesis could be an important factor in the development of LLJ's in the Great Plains.

N80-21926/4 PC **A06**/MF **A01**
Beam Engineering, Inc., Sunnyvale, CA.

High Resolution Vertical Profiles of Wind, Temperature and Humidity Obtained by Computer Processing and Digital Filtering of Radiosonde and Radar Tracking Data from the ITCZ Experiment of 1977.
E. F. Danielson, R. S. Hipskind, and S. E. Gaines. Apr 80, 117p NASA-CR-3269
Contract NAS2-10023

Results are presented from computer processing and digital filtering of radiosonde and radar tracking data obtained during the ITCZ experiment when coordinated measurements were taken daily over a 16 day period across the Panama Canal Zone. The temperature relative humidity and wind velocity profiles are discussed.

N80-21956/1 PC **A12/MF A01**
Eurosat S.A., Geneva (Switzerland).
Study of Potential Benefits from a European Meteorological Space Program.
Final Report.
J. B. Lagarde, B. Exartier, C. Miller, and J. Moscarola. Aug 79, 270p JBL/PR/4462, ESA-CR(P)-1282
Contract ESA-3802/78-F-FC(SC)

The technical benefits from a Eureopean meteorological space program (improved meteorological products) and the economic benefits resulting from expected forecast improvements were studied. The impact of this new facility on the generation of improved meteorological products has proved to be difficult to quantify. Improvement figures - twice higher in Africa/Middle East than in Europe - were produced. A sampling and extrapolation method was developed in order to evaluate the influence of improved weather predictions on the major economic activities, with agriculture and construction surveyed in detail. The benefits derived exceed the projected cost of the European meteorological space program by a factor of the order of 16, for all economic sectors in Europe/Africa/Middle East, over the period 1979 to 1990. Agriculture and construction, taken together, represent 2/3 of these benefits.

PB80-175987 PC **A03/MF A01**
Water and Power Resources Service, Denver, CO. Office of Atmospheric Resources Management.
Users Guide for the Analysis and Interpretation of Satellite Imagery on the High Plains Summer Cloud and Mesoscale Systems,
David A. Matthews. Jan 80, 47p

A guide to the analysis and interpretation of clouds and mesosynoptic systems observed in geosynchronous satellite imagery over the High Plains and Rocky Mountain region of the United States is presented. This guide provides examples of typical cloud types and mesoscale and synoptic-scale systems. Methods used in the identification of these different phenomena are described to show the user how to interpret the information available on visible satellite imagery. Summertime convective and stratiform cases are analyzed with numerous examples of different cloud and cloud system structures.

PB80-176001 PC **A10/MF A01**
Eddy (Amos), Inc., Norman, OK.
An Investigation of Satellite-Radar Correlation Functions.
Final rept. 1 Feb 79-29 Feb 80,
Louis A. Hembree. Mar 80, 214p
Contract DI-9-07-85-V0024

This report addresses the problems of combining the radar and satellite data sets through the use of space time correlation fields. These correlation fields represent the storm structure as implied by the observed data. The correlation fields are modeled using a four-dimensional Gaussian damped cosine function whose parameters reflect the storm characteristics. Several Montana convective storm complexes have been studied to determine the correlation fields which are required for the application of optimum interpolation objective analysis and for the classification of the storms. It is shown that suitable correlation fields can be obtained with respect to the autocorrelation fields; however, a more general correlation model may be required for the cross-correlation fields. Correlations between the satellite data and radar derived rain rates were found to reach values of 0.6 at the space-time lags appropriate to maximizing the correspondence between patterns; consequently, the potential value of using the multivariate objective analysis methodology is established.

PB80-179203 PC **A07/MF A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Summary of Great Lakes Weather and Ice Conditions, Winter 1977-78.
Technical memo.,
R. A. Assel, D. E. Boyce, B. H. DeWitt, J. Wartha, and F. A. Keyes. Dec 79, 135p NOAA-TM-ERL-GLERL-26, NOAA-80032001

The winter of 1977-78 was the 12th coldest since 1850. The north-westerly flow aloft during this winter directed anticyclonic centers to the west and south of the Great Lakes Region, bringing the greatest negative air temperature departure from normal ever recorded on the southern lakes. Ice began forming in the shallows of the Great Lakes in late November. Lake St. Clair was virtually frozen over by early January. The remainder of the Great Lakes neared maximum areal ice extent from mid-February to early March; Lake Superior was 82% covered, Lake Michigan 52%, Lake Huron 89%, Lake Erie 100%, and Lake Ontario 57%. Spring breakup began in mid-March. The bulk of the ice was gone by April 26, but ice was observed as late as May 11 in eastern Lake Erie.

PB80-180102 PC **A09/MF A01**
National Weather Service, Silver Spring, MD. Office of Hydrology.
A Methodology for Point-to-Area Rainfall Frequency Ratios.
Technical rept.,
Vance A. Myers, and Raymond M. Zehr. Feb 80, 182p NOAA-TR-NWS-24, NOAA-80032111

A new procedure is developed for calculating geographically fixed depth-area ratios from dense networks of recording precipitation gages. These ratios are needed to reduce published point precipitation frequencies to areal values.

PB80-180110 PC **A02**
National Environmental Satellite Service, Washington, DC.
An Evaluation of Satellite Precipitation Estimates for a Record Breaking Rainfall,
J. Dane Clark. Mar 80, 8p NOAA-80040704
Pub. in Preprint Volume, Conference on Flash Floods (2nd), held at Atlanta, GA. on March 18-20, 1980 p123-129.

The purpose of this paper is to examine the record rainfall event associated with Tropical Storm Claudette. Analysis and interpretation of satellite data and meteorological parameters are presented in an attempt to identify the dominant factors which produced this excessive rainfall in southeast Texas. The current operational NESS satellite rainfall estimate technique is demonstrated by specific application to the Claudette case. Strengths and weaknesses of the technique are evaluated and specific recommendations are presented.

PB80-180201 PC **A02**
National Environmental Satellite Service, Washington, DC.
Interactive Techniques for the Estimation of Precipitation from Geostationary Imagery,
J. F. Moses. Mar 80, 9p NOAA-80040703
Pub. in Preprint Volume, Conference on Flash Floods (2nd), held in Atlanta, GA, on March 18-20, 1980, p101-108.

The principles of the Scofield/Oliver technique in conjunction with an analytic model formed the basis for the development of the computer techniques and interactive application program. The primary computer technique, a contour integral, uses digital infrared data to identify the convective cloud tops, determine their area, and draw the maximum isohyets. The meteorologist is asked to specify three key parameters: (a) The extent of the maximum isohyet, (b) the cloud growth, and (c) the amplification factors. Based on this information, the application program produces the sums estimates of maximum area rainfall.

PB80-180409 PC **A02/MF A01**
Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS.
The Effect of Hurricane Bob (July 11, 1979) on the St. Louis Bay Tidal Marshes: Transport and Relocation of Debris,
Courtney T. Hackney, and T. Dale Bishop. 1979, 15p MASGP-79-015, NOAA-80032703
Grant NA79AA-D-00049
Prepared in cooperation with University of Southwestern Louisiana, Lafayette.

The effect of a low level hurricane (Bob) on the transport and relocation of marsh debris (dead plant material) was evaluated. Aerial photographs and ground truth data indicated that debris (wrack) was distributed on the marsh along areas of higher vegetation. The mean density of the resultant wrack was 2.19 kg/sqm. Approximately 226,000 kg of unattached dead plant material was removed from the marsh and 7,700 redeposited as wrack. Little or no standing dead plant material was removed. Thus, 218,000 kg of dead plant material was removed from the 96 ha study area and transported from the marsh system.

PB80-180417 PC **A04/MF A01**
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Labs.
Comparison of Estimated and Observed Values for Solar Radiation at the Surface of the African Continent.
Technical memo.,
J. K. Nimira. Jan 80, 51p NOAA-TM-ERL-ARL-83, NOAA-80041601

Solar radiation fluxes at the surface of the African continent were estimated by three methods. The methods used cloud data derived from satellite measurements, observed sunshine hour data, and data on several other parameters measured at 57 ground stations throughout Africa. The estimated values were then compared with actual observed global solar radiation values from 10 selected stations. The percentage deviation between estimated and observed values was generally less than plus or minus 15%.

PB80-180433 PC **A13/MF A01**
Boulder Atmospheric Observatory, CO.
Project PHOENIX. The September 1978 Field Operation,
W. H. Hooke. Dec 79, 292p BOA-1, NOAA-80041603

This report describes the instruments tested and compared and equipment used during Project PHOENIX, a major field study of the planetary boundary layer. The data-gathering systems evaluated include multiple-Doppler radar, microwave radiometer, FM-CW radar, TPQ-11 radar, lidar, optical wind sensors, the Portable Automated Mesonet, rawinsonde, microbarograph, acoustic sounders, balloons, aircraft, and the 300-m BAO tower. Also provided are a discussion of the project's background and planning, a description of the synoptic weather situation during the experiment, instructions for access to the data, and a daily summary log of PHOENIX operations.

PB80-181027 PC **A04/MF A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Study of a Pulsed Coherent Lidar for Crosswind Sensing.
Technical memo.,
S. F. Clifford, T. R. Lawrence, G. R. Ochs, and T-i Wang. Mar 80, 53p NOAA-TM-ERL-WPL-48, NOAA-80032803
Sponsored in part by Army Electronics Research and Development Command, White Sands Missile Range, NH. Atmospheric Sciences Lab.

Under a previous interagency agreement NOAA/WPL performed an investigation of the expected performance of a pulsed coherent lidar system for remote wind measurements in the troposphere in support of artillery firings. This work represents a continuation of the previous effort and documents the work undertaken to assess the validity and impact of particular assumptions made in deriving the system signal-to-noise ratio (SNR) expression utilized in the previous effort. The analysis indicates that the independent turbulence assumption strongly overestimated the effects of turbulence,

that the quadratic power wave structure function assumption was wholly inadequate, and that neglecting the apodization effects amounted to an SNR overestimation at the range where the lidar is focused.

PB80-181712 PC **A05/MF A01**
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Labs.
The South Pole Automatic Condensation Nuclei Counter: Instrument Details and Five Years of Observations,
Mark E. Murphy, and Barry A. Bodhaine. Feb 80, 94p NOAA-TM-ERL-ARL-82, NOAA-80032804

An automatic General Electric (G.E.) condensation nuclei counter has been operating continuously at the Amundson-Scott South Pole station since 1974 as part of the Geophysical Monitoring for Climatic Change (GMCC) program. This instrument (calibrated by a Pollak nuclei counter standard), with its high sensitivity and fast response, can provide continuous aerosol climatology and identify periods of contamination from local sources. The annual variation of nuclei concentration is apparent and is repeatably consistent over the five year period. Nuclei concentrations occasionally reach values as low as 7/cu cm during the austral winter (April through September), begin to increase near the time of astronomical sunrise, and reach values as high as about 240/cu cm during summer months. The continuously operating G.E. condensation nuclei counter in conjunction with the Pollak nuclei counter, have produced an excellent data set over the five year period, 1974-1978.

PB80-181852 PC **A05/MF A01**
National Environmental Satellite Service, Washington, DC.
Environmental Satellite Imagery June 1979.
Key to meteorological records documentation no. 5.4.
Mar 80, 97p NOAA-80042201
See also report dated May 79, PB80-153356.

The Key to Meteorological Records Documentation (KMRD) No. 5.4 series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains daily global satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to assist users in selecting data for research and climatological use.

PB80-183684 PC **A11/MF A01**
National Weather Service, Silver Spring, MD.
NOAA/NWS Catalog of Meteorological Bulletins.
Jan 80, 241p NOAA-80042405

Communications Handbook No. 6, the NOAA/NWS Catalog of Meteorological Bulletins, is a three-section reference manual. Section 1 contains all meteorological bulletins originated at KWBC, sorted by bulletin heading. Section 2 contains foreign meteorological bulletins which are distributed domestically. Section 3 contains aviation-oriented meteorological bulletins which are available from the FAA Request-Reply System. A description of the bulletins, the approximate time of transmission, generation, observation or valid time, and the code used is listed for each entry.

PB80-184658 PC **A09/MF A01**
Jet Propulsion Lab., Pasadena, CA.
Seasat Gulf of Alaska Experiment Workshop. Volume II. Comparison Data Base: Conventional Marine Meteorological and Sea Surface Temperature Analyses, Appendixes A and B,
Peter Woiceshyn. Apr 79, 180p 622-101-VOL-2, NOAA-80033103
See also Volume 1, PB-300 413. Sponsored in part by National Aeronautics and Space Administration, Washington, DC.

Appendix A forms a collection of the surface analyses performed for the Seasat Gulf of Alaska Experiment Workshop. Scalar fields are sea level pressure (SLP), surface air temperature (SAT), sea surface temperature (SST), dew point temperature (DPT) and cloud cover. Two types of wind fields are shown. One is derived from sea level pressure and thermal fields, the other is a direct analysis of ship and buoy wind reports. A brief description of meteorology for the days used as intercomparison data for the Seasat sensors is given. Appendix B documents a subroutine library for deriving earth-located time series of geostrophic, gradient, and surface winds from polar stereographic grid-point fields such as those generated at the National Meteorological Center and Fleet Numerical Weather Central. The library also contains a program for plotting sea-level pressure analyses and vector arrows, based upon the NCAR graphics package, and an objective analysis program using the Cressman technique. Spherical geometric calculations involving polar stereographic grids are internal to the programs.

PB80-186406 PC **A03/MF A01**
Alaska Univ., Fairbanks. Inst. of Marine Science.
Recent Fluctuations in Meteorological and Oceanographic Parameters in Alaska Waters,
H. J. Niebauer. Feb 80, 40p ASGR-79-12, IMS-79-2, NOAA-80042203

In the last few years, especially since 1970, there have been extraordinary variations in the short-term climate over the North Pacific that are hypothesized to cause variations in oceanographic conditions such as sea temperature and ice coverage in Alaskan waters. This report outlines some of the relatively large-scale fluctuations in sea surface temperature, surface and 700 mb (3000 m) winds and ice coverage and their interrelationships. The study areas are the shelf regions of the Gulf of Alaska from Sitka to Kodiak and the southeastern Bering Sea. The time span considered is approximately the early 1960s to the present.

PB80-810773 PC **N01/MF N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Acid Rain. 1975-April, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1975-April 80,
Mary K. Gallagher. May 80, 13p
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations from the international literature describe acid precipitation and its effects on the environment. Topics covered include: air pollution, pollution monitoring, atmospheric composition, meteorological parameters and ecosystems. (Contains 67 citations)

UCID-18530 PC **A03/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
Statistical Analysis of Summer Winds in Geysers Area Prior to ASCOT 1979 Experiment.
W. M. Porch, and J. J. Walton. Feb 80, 26p
Contract W-7405-ENG-48

Statistical analytical techniques were tested on 73 days and 16 stations of hourly data for the summer of 1977. These stations were located in the region surrounding the Geysers geothermal area. Principal components analysis (PCA) was used to define typical wind patterns in the region and to determine typical days for each station. Power spectral analysis was used to quantify the temporal variation of winds at Anderson Ridge and Anderson Springs (two stations included in the ASCOT 1979 study in the local region of Anderson Creek with very different terrain exposures). These results will help determine year to year difference in the wind fields in the ASCOT study region of complex terrain. (ERA citation 05:015560)

UCRL-83612 PC **A02/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
Climate Change Due to Anthropogenic Surface Albedo Modification.
G. L. Potter, H. W. Ellsaesser, M. C. MacCracken, J. S. Ellis, and F. M. Luther. Feb 80, 11p CONF-800309-3
Contract W-7405-ENG-48
International workshop on the energy/climate interactions, Munster, F.R. Germany, 3 Mar 1980.

Using a statistical dynamic climate model with more realistic surface albedo changes than used in previous experiments, we have conducted a numerical experiment combining desertification of the Sahara and deforestation of the tropical rain forest. Over an area of 9 x 10 exp 6 km exp 2 at 20 exp 0 N the desert albedo was increased from 0.16 to 0.35 and over 7 x 10 exp 6 km exp 2 at the equator and 10 exp 0 S the rain forest albedo was increased from 0.07 to 0.16. While the most significant direct climatic responses were observed in the modified zones, high northern latitudes exhibited the greatest cooling through activation of the ice-albedo feedback process. In contrast to Sagan et al., this experiment suggests that anthropogenic modification of surface albedo over the past few thousand years has had an impact on global climate which is likely quite small and probably undetectable. (ERA citation 05:016554)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A083 171/9 PC **A04/MF A01**
Duke Univ Durham NC Graduate School of Business Administration
Translation of Gambles and Aspiration Level Effects in Risky Choice Behavior.
Technical rept.,
John W. Payne, Dan J. Laughhunn, and Roy Crum. Apr 80, 52p Rept no. TR-80-1-ONR
Contract N00014-80-C-0114
Prepared in cooperation with Florida Univ., Gainesville.

Two recent models of risky decision making have emphasized the importance of a target return or a reference point in determining preferences and choices among gambles. The target return and reference point concepts represent variations on an old idea in theories of decision making: level of aspiration. Additional evidence on the need to incorporate an aspiration level type of concept in the analysis of risky choice behavior is presented. In three experiments, the relationship of pairs of gambles to an assumed reference point was varied by adding or subtracting a constant amount of money from all outcomes. The results demonstrate that such translations of outcomes can result in the reversal of choice within pairs of gambles. The effect of such translations on choice depended on whether the size of the translation was sufficient to insure that one gamble in a pair had outcome values either all above or all below the reference point, while the other gamble had outcome values both above and below the reference point. The results are discussed in terms of the Fishburn and Kahneman-Tversky models, as well as other theories of risky decision making. A model of the effects of a reference point on risky choice behavior is presented.

AD-A083 224/6 PC **A06/MF A01**
National Research Council Washington DC Maritime Transportation Research Board
Review and Recommendations for the Interagency Ship Structure Committee's Fiscal 1981 Research Program and Five-Year Research Program Plan.
Final rept.
Mar 80, 116p
Contract DOT-CG-80356-A

The Ship Research Committee (SRC) of the National Research Council provides technical services covering program recommendations, proposal evaluations, and project advice to the interagency Ship Structure Committee (SSC), composed of representatives from the U.S. Coast Guard, The Naval Sea Systems Command, The Military Sealift Command, The Maritime Administration, the American Bureau of Shipping, and the U.S. Geology Survey. This arrangement requires continuing interaction among the SRC, the SSC, the contracting agency, and the project investigators to assure an effective program to improve marine structures through an extension of knowledge of materials, fabrication methods, static and dynamic loading and response, and methods of analysis and design. This report contains the Ship Research Committee's recommended research program for five years, FY 1980-1984, with 13 specific prospectuses for FY 1981. Also included is a brief review of 24 active and 6 recently completed projects. (Author)

AD-A083 423/4 **MF A01**
Office of Naval Research Arlington VA
Naval Research Logistics Quarterly. Volume 27, Number 1.
Mar 80, 172p
See also Volume 26, Number 2, AD-A070 635.
Availability: Superintendent of Documents, GPO, Washington, DC 20402 HC $3.55. Microfiche furnished to DTIC (and NTIS) users.

Contents: Analyzing Availability Using Transfer Function Models and Cross Spectral Analysis; Optimal Maintenance-Repair Policies for the Machine Repair Problem; Benders' Partitioning Scheme Applied to a New Formulation of the Quadratic Assignment Problem; Test Selection for a Mass Screening Program; Optimal Admission Pricing Policies for M/Ek/1 Queues; The Dynamic Transportation Problem: A Survey; The Use of Dynamic Programming Methodology for the Solution of a Class of Nonlinear Programming Problems; The U.S. Versus the Soviet Incentive Models; Theoretical Analysis of Lanchester-Type Combat Between Two Homogeneous Forces With Supporting Fires; On Single-Machine Sequencing With Order Constraints; Statistical Analysis of the Output Data From Terminating Simulations; Computational Experience on an Algorithm for the Transportation Problem With Nonlinear Objective Functions; A Note on Determining Operating Strategies for Probabilistic Vehicle Routing; A Note on the 'Value' of Bounds on EVPI in Stochastic Programming; and A Note on Integer Linear Fractional Programming.

AD-A083 442/4 **PC A06/MF A01**
Air Force Office of Scientific Research Bolling AFB DC
Basic Research in Civil Engineering: USAF Needs and Research Objectives.
Special rept.,
Daniel M. Brown. Jul 78, 101p Rept no. AFOSR-TR-80-0321

The author was a resident research fellow at the Air Force Office of Scientific Research for the period July 1977-July 1978. The report summarizes his review of the subareas that comprise civil engineering and his recommendations for Air Force civil engineering research objectives. Included is a discussion of the structure of the Air Force Engineering and Services community and current research efforts. He concludes that the need exists for a substantial program of basic research in a) Productivity/Livability, b) Environmental Quality, c) Conventional Civil Engineering, and d) Nuclear Weapons Effects Analysis. (Author)

ED-174 245 **Not available NTIS**
National Inst. of Education, Washington, DC.
R & D Products: Search, Retrieval and Utilization,
Ingebory G. Fahs, and Robert M. Gagne. Apr 79, 21p
Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA., on April 9-13, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The Florida R & D Utilization Project has two major goals: to provide schools with access to the best available R & D products and practices to resolve local needs, and to assist schools in developing a capacity for diagnosing and resolving instructional and other problems. This paper describes the 7-step conceptual model that governs the activities of the central search agency that was established to help the 278 participating elementary schools accomplish the first goal. Sections of the paper correspond to steps in the model: describing the problem, interpreting the problem statement, conducting the search, retrieving the outcomes, screening the outcomes, considering the options, and preparing for adoption/adaption. A project evaluation related to utilization is also presented, as well as general implications suggesting that it is possible to develop and implement a program of R & D utilization which is based upon local school problem solving.

N80-22127/8 **PC A03/MF A01**
IIT Research Inst., Chicago, IL.
Manufacturing Process Applications Team (MATEAM).
Annual Report.
E. R. Bangs. Jan 80, 36p NASA-CR-161417, IITRI-J6499
Contract NAS8-32229

The objectives and activities of an aerospace technology transfer group are outlined and programs in various stages of progress are described including the orbital tube flaring device, infrared proximity sensor for robot positioning, laser stripping magnet wire, infrared imaging as welding process tracking system, carbide coating of cutting tools, nondestructive fracture toughness testing of titanium welds, portable solar system for agricultural applications, and an anerobic methane gas generator.

PB80-169006 **PC E08/MF E08**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
The Tennessee Valley Authority: A Field Study.
Final rept.,
H. Knop. cJun 79, 243p RR-79-2

The present report covers four major aspects of the TVA program: the systems approach to regional industrial development programs; the managerial structure of the TVA, including specific management case studies of several key departments; the application of models and computer techniques to management; and the integration of environmental factors into the TVA management and planning proces, including a case study dealing with the environmental decision-making process in the siting of a nuclear power plant. (Copyright (c) 1979 IIASA.)

PB80-170905 **PC A03/MF A01**
Office of Management and Budget, Washington, DC.
Object Class Analysis, Budget for Fiscal Year 1981.
Jan 80, 41p

The tables in the analysis present the Federal Government's obligations in terms of the object classification prescribed in Office of Management and Budget Circular No. A-12. The amounts shown in the tables are based on the detailed schedules in the Budget Appendix for 1981 and provide a distribution by object class of total obligations incurred. Object classes describe the nature of the service or article for which obligations are first incurred, regardless of the purpose or program served. Object class data present the total amount obligated (or estimated for obligation) for the purchase of articles or services.

PB80-170913 **PC A03/MF A01**
Office of Management and Budget, Washington, DC.
Balances of Budget Authority, Budget for Fiscal Year 1981.
Jan 80, 28p

The analysis presents information on the unexpended balances of budget authority carried forward at the end of each of the 3 fiscal years shown in the 1981 Budget: fiscal years 1979, 1980, and 1981. These balances may be obligated or unobligated. They are obligated when budget authority has been obligated but the check to liquidate the obligation has not been issued. They are unobligated when budget authority is available for use but has not been obligated. Balances of budget authority are a natural outgrowth of the Federal budget system, in which outlays can occur only subsequent to the enactment of appropriations or other legislation that provides budget authority. In the aggregate, unexpended balances are the result of a lag between the provision of budget authority and the expenditure of funds.

PB80-170921 **PC A03/MF A01**
Office of Management and Budget, Washington, DC.
Fiscal and Budgetary Information and Controls.
Annual rept.
3 Mar 80, 29p

The Comptroller General's August 31, 1979, report focused primarily on the General Accounting Office's activities in identifying and satisfying the information needs of various Congressional committees. It also recommended that the Executive Branch take certain actions to satisfy congressional information needs. This report addresses the General Accounting Office's recommendations. In addition, this report presents a review of a number of Executive Branch actions during the past year that were directed toward satisfying congressional information needs and a discussion of activities planned by the Department of Treasury and OMB for the coming year.

PB80-171028 **PC A02/MF A01**
Office of Science and Technology Policy, Washington, DC.
Principal Findings and Recommendations on Strengthening Intergovernmental Science and Technology.
30 Jan 79, 10p

The report presents a review of about 50 intergovernmentally-oriented Federal research and development programs and activities. Recommendations are provided which will allow the public to benefit from these Federal research programs.

PB80-173933 **PC A04/MF A01**
General Accounting Office, Washington, DC. Financial and General Management Studies Div.
Productivity Measurement in the Defense Logistics Agency Must Be Supported, Improved, and Used.
Report to the Congress.
18 Apr 80, 62p FGMSD-80-41

The Defense Logistics Agency has one of the best designed productivity measurement systems in the Government but does not base its budget requests on data from the system and makes only limited use of the data for other management purposes. Limited management attention to the system has caused deficiencies which affect its credibility and use. The report recommends a number of ways the Director, Defense Logistics Agency, can ensure that the productivity measurement system is effectively used by managers.

PB80-174477 **PC A11/MF A01**
Environmental Policy Inst., Washington, DC.
Centralized Power: An Examination of the Effects of Centralized and Decentralized Electric Generating Systems of the Political Authorities of Local Governments.
Final rept.,
Marc Messing, H. Paul Friesema, and David Morell. Mar 79, 237p NSF/PRA-7623933/1
Grant NSF-PRA76-23933

The report has two objectives: to determine whether centralization would lead to a shift of authority away from local or state government to regional or federal governments, and conversely, if decentralization would enhance the political authority of local governments. Two procedures were developed: a historic review of utility development and regulation at the state, local and federal levels, and a series of case studies of nineteen power plant decisions. The results are suggestive rather than conclusive.

PB80-174543 **PC A06/MF A01**
George Washington Univ., Washington, DC. Graduate Program in Science, Technology and Public Policy.
Contributions of Policy Analysis to Science and Technology Policy.
Rept. for 1976-77,
John M. Logsdon, and Claudia Van der Heuvel. Jul 78, 121p NSF/PRA-7417486/2
Grant NSF-STP74-17486
See also PB80-174550.

During the period April 1974-September 1978, the George Washington University's Graduate Program in Science, Technology, and Public Policy carried out a variety of activities in support of NSF's University Policy Studies (UPS) Program and held a series of seminars for the Washington science policy community. The report is the proceedings for the 1976-1977 seminars. Topics included: (1) Our Energy Future: planning energy research; (2) Science and Technology Policy: an assessment of future problem areas; and (3) Improving the Utility of Federally-supported Policy Research: a funder's perspective.

PB80-174550 PC **A14/MF A01**
George Washington Univ., Washington, DC. Graduate Program in Science, Technology, and Public Policy.
University Policy Studies Research Program Support and Science Policy Seminars.
Final rept. Apr 74-Sep 78,
John M. Logsdon. Sep 78, 303p NSF/PRA-7417486/1
Grant NSF-PRA74-17486
See also PB80-174543.

During the period April 1974-September 1978, the George Washington University's Graduate Program in Science, Technology, and Public Policy carried out a variety of activities in support of NSF's University Policy Studies (UPS) Program and held a series of seminars for the Washington science policy community. Summary reports on the following topic areas of discussion included: (1) Technology transfer and U.S. Foreign policy; (2) Research and development needs for the making of social policy toward young children; (3) U.S. food and nutrition policies and international food needs; (4) Social aspects of transportation: job access for the disadvantaged; and (5) Social policy analysis and social policy-making.

PB80-174808 PC **A03/MF A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Criteria for Participation in the Urban Development Action Grant Program Should Be Refined.
Report to the Congress.
20 Mar 80, 40p CED-80-80

According to the Department of Housing and Urban Development's eligibility criteria for the Urban Development Action Grant Program, 52 percent, or 333 of the 646, large cities and urban counties in the United States are 'severely distressed' and eligible for Urban Development Action Grants. GAO's review disclosed that the data upon which HUD's criteria are based is old and/or may be unreliable. Some of the time frames and assumptions HUD used are questionable. Also, HUD's method of determining eligibility does not take into account severity of distress for most of the individual criteria. GAO's tests of alternative methods of determining distress indicated that about 25 of 333 currently eligible cities would be replaced by about 25 cities now ineligible for Urban Development Action Grants.

PB80-175045 PC **A03/MF A01**
Office of Management and Budget, Washington, DC.
Federal Grants-in-Aid to State and Local Governments.
Jan 80, 44p

The report is designed to provide budget technicians and other users with an historical data base showing Federal budgets for grants-in-aid for each fiscal year from 1940 on. Definitions are provided for the 1981 budget 'Grants-in-Aid'.

PB80-175532 PC **A03/MF A01**
General Accounting Office, Washington, DC. General Government Div.
Problems in Developing the 1980 Census Mail List.
Report to the Subcommittee on Census and Population, Committee on Post Office and Civil Service, House of Representatives.
31 Mar 80, 40p GGD-80-50

Bureau of the Census' operational difficulties in developing an accurate and complete mail list (used for counting over 90 percent of the population) have caused problems, including (1) delayed completion of the lists for rural and small urban areas, which caused the cancellation of a key Postal Service review; (2) limitations in address lists purchased for major urban areas from commercial mail list vendors; and (3) lack of controls over Postal Service reviews to insure the quality of the Bureau's mail lists. In December 1979, GAO proposed to the Bureau and the Postal Service the need for quality controls for the remaining postal reviews in developing the list. The Postal Service adopted this proposal to help identify missing addresses.

PB80-175557 PC **A04/MF A01**
Office of Science and Technology Policy, Washington, DC.
Federal Coordinating Council for Science, Engineering, and Technology - Activities, 1978-1979.
1979, 56p

The report describes the functions and responsibilities, of the Federal Coordinating Council for Science, Engineering, and Technology, and the work of the full council, the nature of committees, and their specific areas of responsibility and activity.

PB80-175771 PC **A03/MF A01**
Office of Science and Technology Policy, Washington, DC.
Results of the Problem Identification Process Conducted by the Intergovernmental Science, Engineering, and Technology Advisory Panel (ISETAP).
1 Mar 79, 30p

The report presents the list of priority problems identified through the Intergovernmental Science, Engineering, and Technology Advisory Panel (ISETAP) Problem Consolidation Process. The Process was initiated in response to the Congressional charge to ISETAP to identify and set priorities on problems at the State and local level which science and technology might solve or ameliorate.

PB80-175896 PC **A08/MF A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Technology Transfer in Tacoma, Washington: The Case of the Automatic Hydrant Valve.
Final rept.,
Roland J. Cole, and Frederic A. Morris. Jul 79, 174p B-HARC-320-016, NSF/RA-790422
Grant NSF-RDI75-13894
Prepared for Tacoma, Washington.

The report describes the technology transfer process in Tacoma, Washington, with special attention to the case of the automatic hydrant valve adopted and disseminated by the Tacoma Fire Department. Presented are the theories of technology transfer used in planning Tacoma's process: the supply, demand, and linker group of theories. The events of Tacoma's transfer center and of the hydrant valve project are explained. Those events in light of the theories used in planning them are analyzed.

PB80-176183 PC **A07/MF A01**
Technical Assistance Research Program, Inc., Washington, DC.
Feasibility Study to Improve Handling of Consumer Complaints. Federal Agency Complaint-Handling: Evaluation Update,
John Goodman, Marc Grainer, and Elizabeth Hanson. 6 Nov 78, 141p TARP-78-1
Contract DHEW-OS-74-292
See also report dated Apr 75, PB-244 182.

The report provides a reassessment of the complaint-handling systems of 22 Federal agencies. Both Central Office and regional and field office systems were assessed. Progress of the U.S. Office of Consumer Affairs in upgrading both its internal operations and the Federal government as a whole is reported.

PB80-176613 MF **A01**
CONSAD Research Corp., Pittsburgh, PA.
The CONSAD Program Element Evaluation Scheme: The Development and Testing of the Prototype.
16 Feb 78, 392p NSF/RA-780713
Contract NSF-C-7611438
Available Microfiche only because of poor quality.

Some of the processes and decisions invcIved in developing the Prototype Program Element Evaluation Scheme are described. Implementation and testing of the prototype program element evaluation scheme involved the following: (1) program element selection; (2) determination of program element goals; (3) instructional objectives and research activities; (4) project selection; (5) extraction of file documentation; (6) selection and recruitment of project evaluator; (7) production of project syntheses and aggregate analyses; (8) recruitment of program element panels; (9) organization of program element panels; and (10) preparation of evaluation reports. Extensive appendices include papers on generic issues, concepts and instrument development, structural concerns, project synthesis format, aggregate analyses, program selection considerations, and project evaluator selection.

SHR-0000545 PC **A04/MF A01**
Michigan Univ., Ann Arbor. Mental Health Research Inst.
Administrator's Handbook on the Application of Operations Research to the Management of Mental Health Systems.
Harold P. Halpert, William J. Horvath, and John P. Young. 1968, 66p
Contract PH-43-68-1325

A handbook is presented which is designed to introduce mental health administrators to Operations Research (OR), a group of techniques used to solve management problems in human organizations and systems. OR applies scientific methods and mathematical models to problems involving operation of a system. The six steps in the OR problem-solving process are: defining the problem, constructing the model, deriving a solution from the model, testing the model, implementing the solution, observing the effects of changes on the actual operation of the system. The following techniques used in operations research are illustrated: allocation, gaming, inventory, replacement, search, and sequencing or routing. Hypothetical examples are used to suggest potential uses of OR techniques in mental health programs. These hypothetical examples include a satellite facility away from the main mental health center, preventive activities, the flow of patients through the mental health system, appointment scheduling, and data processing. Guidelines are provided for orienting the staff to OR techniques, organizing and administering the OR operation, selecting OR projects, and staffing the OR unit. Appendices contain a glossary, a list of professional societies and journals, and an annotated bibliography.

5B. Documentation and Information Technology

AD-A083 123/0 PC **A04/MF A01**
Battelle Columbus Labs OH
Mechanical Properties Data Center.
Annual rept. 1 Jan-31 Dec 79,
Harold Mindlin, Harold Hucek, and Ross Gubiotti. Mar 80, 60p AMMRC-TR-80-8
Contract DLA900-79-C-0539

This report summarizes MPDC activities for the period 1 January 1979 through 31 December 1979, a total of 12 months, under Contract DLA900-79-C-0539. It provides a summary of the scope, objectives and organization of MPDC, its information processing products, and services, and a discussion of management objectives. The report focuses on the start-up of MPDC and the conversion of the mechanical properties data base to the Battelle data base management system engendered by the change of contractors. (Author)

AD-A083 388/9 PC **A04/MF A01**
Naval Research Lab Washington DC
Summer 1979 Directory of Navy Electro-Optical Professionals.
4th edition,
Manuel R. Pablo. 21 Dec 79, 73p NRL-MR-4136, EOTPO-SR-48, AD-E000 388
Supersedes Rept. nos. EOTPO-SR-17-VOL-1, AD-A004 588, EOTPO-SR-17-VOL-2, AD-A004 589, EOTPO-SR-34, AD-B014 544L and EOTPO-SR-45, AD-A058 592.

The first directory of electro-optical professionals in the Navy was published in July 1974. This fourth edition is the current update and revision of that document. Names are grouped by Navy Command or facility.

AD-A083 600/7 PC **A08/MF A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
Developments in Science and Technology.
Rept. for FY 1978.
1978, 165p Rept no. JHU/APL/DST-6
Contract N00024-78-C-5384

Contents: Force Coordination; Space Science and Technology; Propulsion, Airframe, and Aerody-

namic Technology; Computer Technology Applications; Energy Research and Development; Biomedical Systems; Ocean Science and Technology; Fundamental Research; Urban Technology; and Patents.

CONF-800225-2 PC A02/MF A01
Oak Ridge National Lab., TN.
Quality Assurance Controls in Research Data Base Management: Nonsense Codes in Hierarchical File Structures.
M. P. Farrell, R. H. Strand, A. D. Magoun, C. H. Pennington, and H. Schramm. 1980, 5p
Contract W-7405-ENG-26
SUGI 80 conference, San Antonio, TX, USA, 18 Feb 1980.

In complex studies using multiple data bases composed of hierarchical file structures, there is a high probability that errors may be perpetuated into summary reports unless some form of quality assurance is integrated into the research data base management program. In studies that substitute numeric codes for variable values, this problem of error propagation is even more acute. This paper addresses the problem of error propagation in those studies employing a coding scheme to represent longer alphanumeric values. Several approaches are available that minimize errors in coding variables. Numeric codes with embedded information allocated to positions within the value codes are widely used. Such smart codes require a full knowledge of the universe the variables describe as well as the potential classification schemes for each variable. Nonsense codes, or codes without embedded information, efficiently circumvent the problems associated with smart codes. Alphanumeric variable values are assigned a sequential numeric code as new values are encountered in the data base. With nonsense codes, the management approach is open-ended and does not require a knowledge of the number of potential classification levels for the variables. Experience indicates that coding errors appear to be less frequent with nonsense codes. The use of the FORMAT procedure in SAS/version 79.2 complements the nonsense code approach using variable labeling. Current restrictions in the use of the FORMAT statement and the sort order of the labels in BY statements or PRINT requests can be circumvented by using the PUT function to assign format values to a new character variable. 1 figure. (ERA citation 05:017306)

ED-172 822 Not available NTIS
Texas A and M Univ., College Station. Library.
CAIN Online Users Guide,
Charles L. Gilreath. Apr 76, 176p
Sponsored in part by National Agricultural Library, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This manual, intended for the librarian or information specialist beginning with online systems, introduces the National Agricultural Library's (NAL) Cataloging and Indexing System (CAIN) and presents the search techniques required for retrieving information on agriculture and its many related fields. The manual, which concentrates on the online mode of accessing the CAIN data base, discusses the basic strategies employed in constructing search strategies for online literature retrieval and the fundamentals of establishing computer communications; provides information about the CAIN unit record and cataloging and indexing practices followed by the NAL staff; and details information about access to the CAIN data base, including access with the DIALOG system of Lockheed Retrieval Service and through the ORBIT system of System Development Corporation.

ED-172 823 Not available NTIS
California State Library, Sacramento.
California Public Library Systems Directory, 1979,
Collin Clark. 1979, 50p
For a related document, see IR-007 463. Sponsored in part by Office of Education, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This second statewide public library systems directory includes 15 cooperative and three single jurisdication library systems organized under the California Library Services Act (CLSA) together with their associated library networks, and the regional reference centers or networks serving more than one system organized as demonstration projects under the federal Library Services and Construction Act (LSCA). Entries were developed from materials supplied by each system or project and include addresses, staff names, and policies and services information. An index of public library system members concludes the volume.

ED-172 824 Not available NTIS
California State Library, Sacramento.
CAL INFO: California Agency Libraries and Information Sources,
Michael J. Hardin. Mar 79, 163p
For a related document, see IR-007 462.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This loose-leaf directory of identified California state agency libraries and information sources lists names of staff, address of agency, hours, subject strengths, circulation policies, and services of each agency. Information was collected through questionnaire survey, and telephone and personal interviews. Directory entries are arranged by formal agency titles, while the library name index is arranged by the library's familiar name. A personal name index of librarians and other state employees supervising agency libraries is also included.

ED-172 825 Not available NTIS
New York Public Library, NY.
Children's Books and Recordings. 1978.
1978, 48p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This briefly annotated bibliography of selected children's books and recordings is a salute to the International Year of the Child. Included in its listings is a section highlighting some translations and representative publications from other countries; these depict a range of mores from Edwardian England to that of the Aborigines of Australia. A list of titles by category is followed by a full bibliographic description and annotation for each title in the main body of the work, which is also arranged by category. Minority cultures are well represented, as are books with non-sexist themes; perennial favorites are also mentioned. The 17 categories presented include picture books for preschoolers, picture books for older children, picture book folk and fairy tales, folk and fairy tales, easy-to-read books, stories, stories for older children, holiday stories and songs, poetry, the performing arts, pastimes, designers and builders, nature and science, many people/many ways, background readings on children and literature, new editions and reprints, and recordings. A title/author index is also provided.

ED-172 826 Not available NTIS
North Carolina Univ. at Greensboro. School of Education.
Computer-Based Systems for Increasing Information Access to School Media Center Materials.
Final rept.,
Theodore C. Hines. Nov 78, 170p
Grant OEG-007602238
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The project presented here explored the possibility of using computer-based systems to increase information access to non-text children's materials at the pre-school through elementary (6th grade) school levels. This final report includes an indicative summary as well as ten separate papers that describe a range of applications of proven computer techniques to school media center materials. Detailed reporting is planned for a later data.

ED-172 827 Not available NTIS
Far West Lab. for Educational Research and Development, San Francisco, CA.
Conceptualization of Information Equity Issues in Education,
William Paisley. 14 Feb 79, 64p
Grant NIE-G-78-0203
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This special study for the Educational Dissemination Systems Support Program (EDSSP) contributes to the conceptualization of information equity in education and provides data bearing on equitable provision of information and equitable opportunity to obtain information. Substantively, the conceptualization is illuminated by two exploratory studies of data bearing on Educational Resources Information Center (ERIC) database coverage and on geographical distribution of information programs. Methodologically, the report demonstrates ways to develop and analyze statistical indicators of educational knowledge production, dissemination, and utilization. Data tables and figures are provided, as well as appendices on the methodology of the ERIC database analysis and the frequencies and percentage of variables used in the analysis.

ED-172 828 Not available NTIS
Cooperative Information Network, Stanford, CA.
Cooperative Information Network Staff Development Project: An Evaluative Study with Recommendations.
Final rept.,
Barbara Conroy. 1 Apr 79, 95p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

A study was conducted to examine and evaluate the impact of the Cooperative Information Network (CIN) Staff Development Project (CIN-SD) in individual CIN libraries and to recommend methods for establishing on-going staff development programs in libraries. This report presents findings gathered from a survey employing questionnaires and interviews, provides an assessment through 12 conclusions, and proposes a number of specific recommendations. A large portion of the study is a staff development evaluation form, developed from the CIN staff development experience, and intended as a tool to assist library administrators and staff members in establishing on-going staff development programs in their libraries. Appendices provide the study methodology, survey findings, staff development questionnaires for libraries using and not using CIN-SD, schedules of interview questions (staff and administrator forms), and list of the systems and libraries participating in the study and the library personnel interviewed.

ED-172 829 Not available NTIS
Wisconsin State Dept. of Public Instruction, Madison.
Coping with Copyright,
Elizabeth B. Merriam. 1978, 25p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Publications Sales, Dept. of Public Instruction, 126 Langdon Street, Madison, WI. 53702. (Bulletin no. 8040, Free).

Intended to help librarians, administrators, and trustees better understand the ramifications of the new copyright law, Public Law 94-553, this brief document asks and answers some of the basic questions concerning compliance with it. Appendices provide the minimum guidelines for classroom copying of books and periodicals in nonprofit educational institutions, guidelines under fair use for music, and CONTU guidelines for interlibrary loans; a bibliography of primary and secondary sources is also included.

ED-172 831 Not available NTIS
Alaska Conference on Library and Information Services: An Evaluation,
Phyllis I. Dalton. 1979, 35p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Based on the author's observation of the activities of this pre-White House Conference on Library and Information Services and a synthesis of the reactions of the conference delegates, this evaluation

assesses the extent to which this conference, held in Juneau on March 8-9, 1979, met its own objectives. A discussion of library and information services in Alaska provides the reader with background for the conference. Evaluation goals and procedures are presented, as well as a statement of the goals and objectives of the White House Conference on Library and Information Services and the Alaska conference. The attainment of stated objectives, measured by responses to a participant evaluation questionnaire, is evaluated and followed by a summary of participant comments. A discussion of the success of the conference by seven additional criteria, conclusions, and recommendations conclude the report; appendices include the evaluation questionnare (tabulated), examples of conference recommendations, and selected references.

ED-172 832 Not available NTIS
Library of Congress, Washington, DC. Div. for the Blind and Physically Handicapped.
Report on Questions Raised and Requests Made at the 1978 National Conference of Librarians Serving Blind and Physically Handicapped Readers.
Apr 79, 58p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report outlines topics addressed at the meeting in the areas of policy and procedures, planning and development, reading materials, equipment, reference services, music services, volunteer services, and publication services; information is presented in question and answer format in each subject area. Questions and comments directed to guest speakers and panelists who participated in the conference are included in six appendices, which are concerned with access to the media, volunteer resources, student resources, religious resources, training, and extension of services. A list of conference attendees is also included.

ED-174 224 Not available NTIS
Wisconsin State Dept. of Public Instruction, Madison. Div. of Library Services.
Proceedings of a Workshop on Area Patterns for Resource Sharing.
31 Mar 78, 46p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

On March 31, 1978, over 70 administrators of libraries, library staff members, and network representatives from all types and sizes of libraries in all areas of Wisconsin participated in a workshop to investigate alternative structures for providing interlibrary loan and reference referral services at the state and area levels. These proceedings from the workshop present the texts of the four speakers' addresses on the definition of resource sharing, resource sharing and new technology, state-level library resource development, and alternative patterns for resource sharing (unstructured, clearinghouse, multiple resource center). Summaries of those discussions are presented in tables that list the disadvantages and advantages of each pattern by the number of groups citing them. Appendices provide the workshop agenda, workshop goal and objectives, a list of workshop participants, and summaries of small group discussions by geographical area.

ED-174 226 Not available NTIS
Wisconsin Univ.-Madison. Faye McBeath Inst. on Aging and Adult Life.
Seminar on Bibliotherapy. Proceedings of Sessions, June 21-23, 1978 in Madison, Wisconsin,
Margaret E. Monroe. 1978, 186p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

These seven papers and the summary of discussion that accompanied their presentation represent the proceedings of a seminar on bibliotherapy conducted by the Library School of the University of Wisconsin. The papers were designed to distinguish the role of psychotherapist from that of librarian or educator in the bibliotherapeutic process, and to develop a clearer picture of the relationship of mental health professionals and librarians/educators in the theory and practice of bibliotherapy. Topics were chosen to probe the bibliotherapeutic process in general, and its application to older adults in particular. Appendices include a list of the participants, guidelines for book analysis, and an orientation to the bibliotherapeutic process for librarians.

ED-174 227 Not available NTIS
Catholic Library Association, St. Louis, MO.
School Media Centers: A Handbook for Elementary Librarians,
Eleanora A. Baer. 1978, 48p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Standard procedures for organizing and operating elementary school media centers are presented in simplified form in this handbook for librarians. Topics covered include media selection, supplies, acquisition procedure, accessioning, classification, cataloging (both books and non-book printed materials), printed catalog cards, filing rules, inventory, vertical file materials, circulation, mending and binding, reports, and publicity. A glossary of terms and an index are provided.

ED-174 228 Not available NTIS
New York Univ., NY. Elmer Holmes Bobst Library.
Selected Sources, Resources and Services at the New York University Bobst Library,
Roger A. Jones. Feb 78, 31p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Intended for students and researchers at the Elmer Holmes Bobst Library at New York University, this document is comprised of a group of nine short research guides which present selected library resources on specific research areas or for specific student groups. Included are library resources for journalism students, a research guide on international relations, library orientation for bilingual education, sources and services for politics students, library orientation for Mexican-Americans, library resources on migrants and migration, sources for research in educational history, a guide to government documents, and a fact sheet on congressional information sources. The typical format in each provides a list of useful subject headings, an annotated list of such reference materials as indexes, journals, and books, and a description of supportive library services, primarily interlibrary loan.

ED-174 229 Not available NTIS
South Dakota State Library, Pierre.
South Dakota Public Library Trustees Manual.
1979, 58p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Intended to provide information which South Dakota Public Library Trustees may wish to use in the performance of their duties, this manual suggests useful practices and shares successful and desirable methods of representing the community through the library board, provides an up-to-date and reasonably comprehensive source of general information for practicing and potential trustees, and supplies material as background for discussion and decision-making by local boards. It includes definitions/descriptions of the trust, a good library, and good library trustees, as well as sections on trustee qualifications and responsibilities, activities, and resources. Checklists for a self-study of a small library, model policy statements and bylaws, a budgeting form with guidelines, a glossary, and a list of references are included.

ED-174 230 Not available NTIS
Battelle Memorial Inst., Columbus, OH.
A Study of the Braille and Talking Book Program in Ohio.
Final rept.,
Michael E. Wessells. 13 Feb 79, 144p
Sponsored in part by Office of Education, Washington, DC. Prepared in cooperation with Ohio State Library, Columbus.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This study evaluates user satisfaction and the cost effectiveness of the use of computer systems in the Braille and Talking Book Program of the Ohio Regional Libraries for the Blind and Physically Handicapped, and makes recommendations for patterns of service and funding. This report provides an executive summary as well as a 3-part presentation of aspects of the program. Part I covers present service: library services to the blind and physically handicapped in Ohio, delivery patterns, a telephone survey of program users, and an evaluation of present service and recommendations. Part II evaluates the regional library computer systems: elements of an automated circulation system for the Libraries for the Blind and Physically Handicapped, history of computerization at the Regional Libraries, evaluation, and costs. Part III discusses alternatives and recommendations for service structure and funding. Appendices provide the survey instrument used in the telephone survey of program users as well as a directory of the libraries and agencies involved in the program.

ED-174 231 Not available NTIS
Florida State Univ., Tallahassee. School of Library Science.
A Study of the Combined School Public Library. Phase II,
Shirley L. Aaron. 1978, 96p
For related documents, see IR-007 508 and ED-150 986. Sponsored in part by Office of Education, Washington, DC. Prepared in cooperation with Florida State Library, Tallahassee.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This second part of a 3-phase study, which examined the potential of cooperative ventures and combination libraries for improving school and public library services in Florida, analyzed past and present attempts at mergers and multi-type library cooperative activities to assess the present status of combinations and library cooperation in the state. Data were collected through interviews with administrators of two community libraries in one county and questionnaires sent to directors of public library systems, directors of municipal libraries, and district school media supervisors throughout Florida. Responses were categorized by type of library affiliation and analyzed to provide preliminary insights into the status of multi-type library cooperation in Florida. Appendices include the questionnaires and the interview schedule.

ED-174 232 Not available NTIS
Florida State Univ., Tallahassee. School of Library Science.
A Study of the Combined School Public Library. Phase III,
Shirley L. Aaron. 1978, 21p
For related documents, see IR-007 507 and ED-150 986. Sponsored in part by Office of Education, Washington, DC. Prepared in cooperation with Florida State Library, Tallahassee.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The development of a checklist was the principal activity of the third part of a 3-phase study examining the potential of cooperative ventures and combination libraries for improving school and public library services in Florida. This report includes the checklist, which was designed for use by community members working with professional library personnel in deciding on the best alternative for library services in a particular locality, together with instructions for its completion and the evaluation of responses. Recommendations based on findings of the study conclude the report.

ED-174 233 Not available NTIS
Thinking New System(s). Some Action Items,
James I. Penrod, and Larry N. Craft. Dec 78, 51p
Paper presented at the 1978 CAUSE National Conference, New Orleans, LA., on December 12-15, 1978.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The planning for, design, and implementation of information management systems in colleges and universities is approaching a state of adolescence

as a science. Because rules cannot be devised with sufficient scope and depth to cover all institutional and systems contingencies, the necessary activities remain somewhere between magic and art. At least 10 different efforts should be made in the early stages of systems planning which relate to facilities management, a systems committee, the user liaison functions, seminars, data base management, advisory committees, implementation task groups, a procedures committee, user training, and evaluation. Attachments include a systems seminar model for increased participant consciousness in a planned organizational change, a systems seminar end-of-meeting evaluation instrument, a responsibility statement for data base administrators, user module checklist tables, and a university procedures committee responsibility matrix.

ED-174 234 Not available NTIS
Southeast Missouri State Univ., Cape Girardeau. Kent Library.
U.S. Government Documents: A Guide to Sources of Information,
Duane E. Henricks. 1979, 12p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Southeast Missouri State University's Kent Library is the only federal depository library in Missouri's 10th Congressional District and has a collection of over 150,000 U.S. Government documents. This resource guide identifies and describes the reference tools needed to access information in that collection. It includes short sections on basic document indexes, subject bibliographies, scientific and technical reports, historical searches, guides, statistics, and Congressional information; a title index is also provided.

ED-174 237 Not available NTIS
McGill Univ., Montreal (Quebec), McLennan Library.
Theses and Dissertations: A Student's Guide to General Bibliographic Sources Available in the McGill Libraries,
Suzy M. Slavin. 1979, 10p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Four guides and 10 national and institutional listings of bibliographic sources for locating theses and dissertations are described for the user of the McGill Libraries. Annotated listings cover national and institutional bibliographic sources in Canada, as well as national sources in the United States, Australia, France, Germany, Great Britain, Ireland, India, Soviet Union, Sweden, and Switzerland. Information for obtaining copies of dissertations is provided.

ED-174 253 Not available NTIS
Coos County Library Association, North Bend, OR.
Coos Cooperative Library Service: Guidelines for Cooperative Library Service, Coos County, Oregon,
Phyllis I. Dalton. 1979, 95p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

A comprehensive plan for the development of equitable library service on a cooperative and cost effective basis in Coos County is presented in this report. Topics covered are library resources and services in the county, cooperative library service organization, utilization of total resources and services, special needs and special services, staffing, planning and implementation, funding, governmental relationships, and an alternate plan. Other sections of the report provide such characteristics of Coos County as geography and climate, characteristics of library service in the county, and recommended pilot projects. Appendices include the basic assumptions of the report, library statistics, maps, and selected references.

ED-174 255 Not available NTIS
Federal Laboratory Consortium.
Federal Laboratory Consortium Resource Directory.
Sep 78, 391p
Sponsored in part by National Science Foundation, Washington, DC. Office of Intergovernmental Science Programs.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Designed to bridge the communication gap between the Federal Laboratory Consortium (FIC) and public and private sectors of the country, this directory has been prepared as a compilation of scientific and technical research and development activities at federal laboratories, which are directing technology transfer efforts toward increasing the use of their research results by decision makers and operational agencies in the public and private sectors. The directory is organized in three parts: Part I contains a map indicating the various regions of the FLC, an alphabetical listing (by abbreviation) of the member laboratories, a list of participating laboratories/contacts by geographic region, and a list of the CONTAC (Contacts for Technological Area Coordination) laboratories. An alphabetical listing of FLC laboratories provides quick cross reference for the following sections, and a list of CONTAC laboratories indicates the primary laboratory that may be contacted for each major application area. Part II is a rundown of the major application areas and the laboratories with expertise in these areas. Information sheets for each laboratory indicate specific scientific and technological areas of expertise and the contact person for that facility. Finally, Part III provides examples of laboratory technology transfer projects in a majority of the scientific and technological activities.

ED-174 256 Not available NTIS
Texas State Library, Austin. Dept. of Library Development.
Handbook of Reference Sources. Second Edition,
Margaret Irby Nichols. 1979, 341p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Designed to serve as a selection aid for small public libraries and to list important sources available through the major resource centers of the Texas Library System, this bibliography lists 804 annotated reference sources with 126 additional works named within the annotations. The books are grouped into 18 major areas, each of which is broken down into smaller subsets: (1) Bibliographies, (2) General Reference Tools, (3) Encyclopedias, (4) Dictionaries, (5) General Biography and Genealogy; (6) Literature, (7) Visual Arts, (8) Performing Arts, (9) Philosophy and Religion, (10) Social Sciences, (11) Geography and Archaeology, (12) Education, (13) Political Science and Law, (14) Business and Economics, (15) History, (16) Sports, Hobbies, and Recreation, (17) Science, and (18) Applied Sciences. Of the total number of references (930), 310 are starred as most suitable for selection by a small library, and prices and International Standard Book Numbers are provided for most items. An index is included.

ED-174 257 Not available NTIS
Texas State Library, Austin. Dept. of Library Development.
'In Search of Texas Treasures' 1979. A Librarian's Planning Handbook,
Shirley Lukenbill, and Anne Hollingsworth. 1979, 73p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This handbook provides planning, resources, and activities guidelines to assist libraries in implementing the Texas Summer Reading Club program for 1979 on folklore, the theme of which is 'In Search of Texas Treasures.' The manual is designed to aid those new at organizing a Summer Reading Club program and to complement activities already scheduled. Guidelines cover the setting of goals and objectives, plans for implementing objectives, and program evaluation. As part of the planning process, the identification and compilation of library and community resources are discussed. Specific activity ideas outlined for the program include an oral history project, arts and crafts programs, ideas for bulletin boards, a program on cowboys, a game on Texas wildlife, and mini-programs. The annotated subject bibliography which is appended covers the areas of children's literature, crafts and games, drama and puppetry, folklore, pirates and buried treasure, planning and publicizing library programs, storytelling, and Texas cultures and history.

ED-174 258 Not available NTIS
Association of Jesuit Colleges and Universities, Washington, DC.
Libraries of Jesuit Colleges and Universities. Annual Survey, 1977-78,
Joanne R. Buster. Mar 79, 13p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report contains statistical data for 24 member institutions of the Association of Jesuit Colleges and Universities in the areas of collections, facilities, services, staffing, and expenditures, based on the 1977-78 fiscal year. Responses to a survey were received from 24 member libraries; however, only 17 respondents reported complete or partial personnel and salary information. A directory of member libraries is included.

ED-174 259 Not available NTIS
The Library Committee of the Capitol Consortium for Continuing Higher Education, Richmond, Virginia,
Gerard E. McCabe. 3 May 79, 10p
Paper presented at the Biennial Institute Collection Development Update (8th), Richmond, VA. on May 3, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report on the work of the Library Committee of the Capitol Consortium for Continuing Higher Education, one of six regional Consortia in Virginia, focuses on cooperative projects, including a proposal for a Periodicals in Richmond Area Libraries List. The proposed list, which is judged essential for resource sharing and for continuing education library support in a 12-county area, will follow a MARC format and other recommended standards for machine compatibility. Disposition of college program funds by the committee is also discussed as a brief review of cooperative library efforts in the Richmond area over the last decade.

ED-174 260 Not available NTIS
Presbyterian Coll., Clinton, SC. Library.
Library Service Enhancement Program, 1976-1977. Presbyterian College Library.
2 Jun 77, 58p
Prepared in cooperation with Council on Library Resources, Inc., Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This document contains the program proposal, interim reports, and final report of the program evaluation for a program of bibliographic instruction which is part of the curriculum, and taught by faculty working with librarians at Presbyterian College. Objectives were based around three assumptions: (1) a close working relationship with faculty is essential to a teaching library; (2) teaching of library skills must be built into the 4-year curriculum and adapted to the needs and capabilities of the individual student; and (3) trained student assistants acquire skills, competencies, and attitudes which can be of great benefit to them and to other students. Instructional material included library guides, term paper clinics, and library methods courses. In addition, librarians and faculty were involved in conferences, visits to other teaching libraries, department meetings, literature searching, workshops, and holdings surveys in order to improve bibliographic classroom instruction. An evaluation of the program by the library director and academic dean indicated that the faculty were responsive, the pedagogical competence of the teaching staff improved, and the students acquired library skills.

ED-174 261 Not available NTIS
Tusculum Coll., Greenville, TN.
Library Service Enhancement Program. Tusculum College.
Final rept. Jul 1, 77-Jun 30, 78.

30 Jun 78, 88p
Prepared in cooperation with Council on Library Resources, Inc., Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This document presents the quarterly reports including narrative, summary, and financial reports, program evaluation, instructional materials, and supporting documents for the Library Service Enhancement Program (LSEP) at Tusculum College, an instructional program designed to ensure the bibliographic competency of all graduating sociology/social services majores. Major activities undertaken under the LSEP involved faculty development activities, course-related bibliographic instruction in the disciplines of English, biology, education, and sociology/social services, and long-range planning with classroom faculty. These activities are outlined by the project librarian and the results are discussed in the library director's program evaluation. This evaluation analyzes program objectives, staff and faculty activity, integration into regular library services, effects on students, and program usefulness. Comments and observations on the effectiveness of the LSEP and its contribution to the institution's educational goals are contributed by the academic dean. The LSEP proposal, instructional materials, and pertinent correspondence are included.

ED-174 264 Not available NTIS
Committee for the Coordination of National Bibliographic Control, Washington, DC.
Study of Current and Potential Uses of International Standard Book Number in United States Libraries.
Final rept.,
Helen F. Schmierer, and Howard Pasternack. 23 Mar 77, 132p
Sponsored in part by Council on Library Resources, Inc., Washington, DC. National Commission on Libraries and Information Science, Washington, DC. National Science Foundation, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Summarizing a literature review and three questionnaire surveys, this study reports on the amount and types of both current and potential use of the International Standard Book Number (ISBN) by United States Libraries. It is divided into five parts: (1) literature survey and analysis, including the library use of ISBN in cataloging, circulation, interlibrary loan, and acquisitions; (2) questionnaire survey of libraries; (3) questionnaire survey of library supervisors of large urban school systems; (4) questionnaire survey of vendors of technical processing services to libraries; and (5) conclusions and recommendations. Each of the survey sections discusses the sample population and questionnaire design and provides an analysis of the questionnaire responses. Data are displayed in 44 tables.

NUREG-0540-V-2-2 PC **A22**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Title List of Documents Made Publicly Available, February 1-29, 1980. Volume 2, Number 2.
Monthly rept.
Apr 80, 505p
See also Volume 2, Number 1, NUREG-0540-V-2-1.

The document is a monthly publication containing descriptions of information received and generated by the U.S. NRC. This information includes (1) docketed material associated with civilian nuclear power plants and other uses of radioactive materials and (2) nondocketed material received and generated by NRC pertinent to its role as a regulatory agency. The docketed information includes information formerly issued through U.S. Department of Energy's Technical Information Center under the title Power Reactor Docket Information (PRDI). This document replaces PRDI, which will no longer be prepared. It is indexed by a Personal Author Index, Corporate Source Index, and Report Number Index.

N80-22120/3 PC **A99**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
NASA Patent Abstracts Bibliography. A Continuing Bibliography. Section 2: Indexes, Supplement 16.
Jan 80, 646p NASA-SP-7039(16)-Sec-2

Citations of patents and patent applications for the period May 1969 through December 1979 are indexed according to subject, invention, source, U. S. patent number, and accession number.

PB80-139900 MF**$600.00**
National Technical Information Service, Springfield, VA.
NTIS Title Index (Retrospective, 1964-1978).
Dec 78, 1332 MF sheets NTIS/TI-78
See also NTIS Title Index (Current), PB80-916000. Microfiche copy only.

NTIS Title Index (Retrospective) covers all reports incorporated into the NTIS Data Base from mid-1964 through 1978. Indexes are on 48x microfiche in three sections: (1) Key Word Out of Context (KWOC) Title Index; (2) Accession/Report Number Index; (3) Personal Author Index. A quarterly cumulated index series corresponding to those in the retroactive file started in January 1979 (see PB80-916000) and is available. This quarterly index series cumulates over a two-year cycle.

PB80-168289 PC **E04**/MF **E04**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
International Data Exchange and the Application of Informatics Technology - Critical Research Needs.
Final rept.,
D. Penniman, A. Butrimenko, and J. Page. c1978, 89p RM-78-43

The method used in conducting this study involved an expert panel convened for a one-day workshop in Toronto in August 1977 to generate a preliminary list of research issues. Following the workshop a mailed questionnaire to the participants provided quantitative evaluation of the issues with respect to overall urgency and specific appropriateness for further IIASA research. The complete list of research issues evaluated and particularly the urgent issues not rated highly appropriate for IIASA (including issues with a major focus on developing-country needs and issues dealing with development of services to meet specific user needs) should provide researchers and policy makers with guidelines for research within their own institutions.

PB80-171010 PC**$9.50**/MF **A01**
Volunteers in Technical Assistance, Inc., Mt. Rainier, MD.
Directory of Development Resources: Africa,
Dennis Culkin, Sabra Breslin, and Marilyn Chakroff. Jul 79, 213p

The volume represents the sub-Saharan section of VITA's series of regional directories of development resources. The directory is arranged by country with development organizations listed alphabetically within each country section. Each listing contains the name of the organization; the mailing address; the street address; the person to contact; and the organization objectives, areas of activity, services, and publications. There are three separate indexes in the directory. The first lists all the organizations alphabetically without geographical bias. The second is an area activities index. The third is a services index. 233 organizations are listed.

PB80-176043 PC **A02**/MF **A01**
Executive Office of the President, Washington, DC. Office of Administration.
A Guide to Publications of the Executive Office of the President. Volume 1, Issue 3.
Quarterly rept.
1979, 18p
See also Volume 1, Issue 2, PB80-140338.

The Guide to Publications of the Executive Office of the President contains citations to EOP publications that are available to the public. Publications are arranged alphabetically under each sponsoring EOP agency. Availability and access points for EOP publications are noted within each citation.

PB80-178593 PC **A09**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Methods for Evaluating Costs of Automated Hospital Information System. Final Report and Executive Summary.
Final rept. 19 Jul 79-19 Jan 80,
Erica Drazen. 14 Mar 80, 200p NCHSR-80-36
Contract PHS-233-79-3000

This study was conducted in critique methodologies for assessing the cost impacts of automated hospital information systems (AHIS). Research done in this area in the past has been assembled and reviewed. Approaches in these studies to the identification, prediction or measurement, and analytical treatment of specific cost impacts are compared and their adequacy and validity assessed. Conclusions are drawn about the current state of the art of assessing AHIS cost impacts. Recommendations are made concerning the best available techniques. Further research is also recommended in the improvement of specific cost assessment methods and in the development of better information on the influence of automated information handling on hospital costs.

PB80-181101 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Research Labs.
Scientific and Technical Publications of the Environmental Research Laboratories. Fiscal Year 1979-October 1, 1978 through September 30, 1979.
Oct 79, 38p NOAA-80032822

As the research arm of the National Oceanic and Atmospheric Administration, the Environmental Research Laboratories' work is aimed at supporting the present assignments and developing the future services of NOAA. Programs include investigation of ocean processes and their interactions with the atmosphere; studies of the ocean environment as it is affected by waste disposal and development of energy resources; fundamental studies of the upper atmosphere and space environments; lower atmosphere research on the weather and climates; research on tsunamis, severe local storms, and hurricanes; studies of weather modification, and the environmental effects of global pollution or similar influences on ecology; and development of equipment, instruments, systems and facilities for these programs.

PB80-182918 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
A Citizen's Guide to Sources for Marine and Coastal Information in Massachusetts. Revised Edition.
Feb 80, 77p MITSG-79-29, NOAA-80040707
Grant NOAA-04-7-158-44079

The first Citizen's Guide was published in 1977 by the Sea Grant Advisory Services in response to the public's inquiries about marine-related questions such as new business opportunities, research information sources, education facilities, or government regulations. A concise directory of information sources proved useful to individuals, local groups, and business organizations in finding the information they needed. This revised edition incorporates deletions, additions, and recommendations from citizens who have used the first Guide and the organizations listed. All organizations in this Guide are listed alphabetically and indexed by specialty.

PB80-183106 PC **A05**/MF **A01**
Holman (John F.) Co., Inc., Washington, DC.
Index of Technical Publications.
Apr 64, 84p
Contract AID-RSSA-931-0067

The index is a comprehensive listing of publications in: Community Development; Food and Agriculture; Housing, Building, and Planning; Industry and Management; Labor and Manpower; Public Administration; and Public Health. However, many other subjects such as marketing, safety, transportation, cooperatives, and communications media are also included. This material has been published by the Agency of International Development (AID) or made available through AID for distribution to United States technicians and counterpart technicians and institutions wherever development programs are underway.

PB80-916000 Suscription
National Technical Information Service, Springfield, VA.
NTIS Title Index (Current).
Quarterly repts.
1980, 4 issues NTIS/TI-79/80
Microfiche (48X) available on subscription, North American Continent price $300.00; all others write for quote. Includes all entries starting January 1979 to date of issue. See also NTIS Title Index (Retrospective), PB80-139900. Current Index also available with Retrospective Index as PB80-916100.

NTIS Title Index (Current) covers all reports incorporated into the NTIS Data Base starting with January 1979. It is issued quarterly; cumulated and merged for two years. Indexes are on 48x microfiche in three sections: (1) Key Word Out of Context (KWOC) Title Index; (2) Accession/Report Number Index; (3) Personal Author Index.

PB80-916100 Subscription
National Technical Information Service, Springfield, VA.
NTIS Title Index (Current, from January 1979) and NTIS Title Index (Retrospective, 1964-1978).
1980, approx. 5 issues
Microfiche (48X) available on subscription, North American Continent price $800.00; all others write for quote.

The report is a combined title index of current titles and the retrospective volume of NTIS holdings.

RISO-374 PC **A06**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Physics Department Annual Progress Report, 1 January - 31 December 1977.
H. Bjerrum Moeller, and B. Lebech. 1 Dec 77, 105p
U.S. Sales Only.

The principal activities in these fields are presented in this report that covers the period from 1 January to 31 December 1977. Introductions to the work in each of the main fields are given in the respective sections of the report. (Atomindex citation 10:438445)

SHR-0002849 PC **A08**/MF **A01**
Center for Human Services, Cleveland, OH.
Management Information System Manual.
Joan T. Sessions, and Rene Y. Williams. Jun 78, 152p

This manual describes the structure and operation of the Management Information System (MIS) designed for the Center for Human Services. The manual is intended both for those engaged in processing data for the system and for those who wish to understand the output reports. A management information system is a systematized method for collecting, recording, classifying, and reporting information about consumers and agency management. A complete system contains six major types of information: planning, case movement (service process), service utility, time utilization, outcome evaluation, and financial information. The MIS is designed to interface with the Financial Reporting System, and represents revisions requested by the Center. The objective of the MIS is to provide information to meet the following needs: (1) an information base to plan and budget for function, manpower, and staff development, for supervising and managing service operations, for analyzing service operations at the unit and worker level, and for analyzing, planning, and measuring the delivery of services to consumers; (2) the accountability reporting requirements of United Way services, government funding Agencies, private funding agencies, and the public; (3) an operating basis as a service provider for government and other third party purchase of service contracts; and (4) the consolidated operation of the center. The major emphasis of the MIS is on providing information required for the internal management and operation of the center, such as information required on special reports for outside funding organizations. Samples of the input sheets and the output reports are presented, along with descriptions of procedures to be followed for their preparation. The kinds of reports represented here include time, service activity, service process and disposition of application, planning information, and attendance and enrollment. Exhibits and flow charts are included.

SHR-0002891 PC **A04**/MF **A01**
Office of the Assistant Secretary for Human Development Services (HEW), Washington, DC.
Proceedings: Information Resources Seminar. Office for Handicapped Individuals/Clearinghouse.
Mar 78, 56p

Information providers serving handicapped individuals and service personnel convened in March 1978 in Washington, D.C., to discuss resources available to handicapped individuals in the areas of architectural barriers, recreation and leisure, and education. Three purposes of the seminar were to provide an opportunity to learn about resources available from national level information providers, to experiment with information networking by testing the hypothesis that personal contacts developed at the meeting will result in changes and improvements in information services, and to create resource documents pertaining to subject areas of the seminar. Panelists gave detailed explanations of resources and services provided by their organizations. Seminar participants raised questions and issues of relevance to services for the handicapped and identified additional resources. Both panelists and participants represented a mix of personnel from Federal agencies, project grantees receiving Federal funds, and private agencies providing information services. In addition to a presentation on networking, four architectural accessibility, six education, and four recreation and leisure presentations were made. Appendices list seminar panelists and participants. Portions of this document are not fully legible.

SHR-0003118 PC **A04**/MF **A01**
Lane County Dept. of Community Health and Social Services, Eugene, OR. Social Services Div.
Guide for the Development of Data Management Systems.
Mary F. Walston. Dec 77, 67p
Contract DHEW-RX-2003-86

The development of a yearling management information system for a particular integrated human services organization is discussed, and instructions are given to aid similiar organizations in undertaking such a task. The Lane County (Oregon) Division of Social Services operates a number of separate social service programs for a variety of target groups. The programs require voluminous amounts of data, information, and reports for external funding sources and internal management. In light of this, Division administration decided to begin a common reporting information system (steps in system development are described) and chose the CETA program as its first client. In April 1976, the Lane Employment and Training Information System became operational. It not only collected, collated, and reported information for the CETA program, but also did the same for the Youth Employment and Training Component and the Summer Youth Employment Program. The system has shown that a large, complex program can be managed more effectively with the use of data and information generated by a computer system. Still, it cannot be considered to be a common information system, because the type of data collected dealt with a specific type of service. General steps to be taken toward a centralized, common management information system with a client data - base application are discussed. They include the rationale for a centralized system, administrative commitment, definitions of a centralized information system, common data elements, common reporting cycles, common perceptions and expectations, designing a common form, computer programming, data completion guides, staff training, implementation, feedback, modification, operations and maintenance, planning, monitoring, and evaluation. The level of present development (1977) of a common management information system for the Lane County Division of Social Services is reviewed. The appendices include a list of adopted department common data elements, common report elements, and samples of data forms.

5C. Economics

AD-A083 040/6 MF **A01**
Army Troop Support and Aviation Materiel Readiness Command St Louis MO
Historical Inflation Program. (A Computer Program Generating Historical Inflation Indices for Army Aircraft). Revision.
Final rept.,
Warren H. Gille, Jr. Jan 80, 77p Rept no. TSARCOM-TR-80-1
Revision to rept. no. TSARCOM-TR-79-1 dated Feb 79, AD-A067 207.
Availability: Microfiche copies only.

This report extends and revises Technical Report 79-1 AD-A067 207 which presents and describes the Historical Inflation Program, a computer program generating historical inflation indices for Army aircrald. The program can be updated monthly, is easily revised for changes in Bureau of Labor Statistics methods, and is capable of handling data for all fiscal year formats. Output is expressed as monthly, quarterly, Fiscal Year, and Calendar Year inflation indices (in CAlendar Year 1967 base) and inflation factors (in any Fiscal Year base). This report contains updated tables of inflation factors, expressed in a FY 79 base. These indices and factors provide a means of adjusting historical cost data for the procurement of Army Aircraft to constant year dollars. Additional features include: computations for the Derivation of Revised Weighting Factors, detailed indices enabling the adjustment of historical Labor and Material cost separately, a discussion of aggregate weighting factors for Labor and Materials, (including trends from sensitivity analysis with more background materials), and additional documentation aimed at making the report useful to a large cross section of the DOD/Rotary Wing Aircraft Community.

DIB-80-06-500 PC$10.00/MF **A01**
Ronai Y. Asociados S.R.L., Caracas (Venezuela).
Venezuelan Market Study on Security Devices, Equipment and Systems.
Foreign market survey rept. (Final).
26 Mar 79, 87p
U.S. sales only for 8 months. Available to foreign addressees in Jan 81.

The market research was undertaken to study the present and potential US share of the market in Venezuela for security devices, equipment and systems; to examine growth trends in Venezuelan end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Venezuela were also reviewed.

DIB-80-06-501 PC$10.00/MF **A01**
Aktiebolaget Konsulterna for Industri och Handel, Stockholm (Sweden).
Market Survey: Medical Equipment (Sweden).
Foreign market survey rept.
1979, 164p
U.S. sales only for 8 months. Available to foreign addressees in Jan 81.

The market research was undertaken to study the present and potential US share of the market in Sweden for medical equipment; to examine growth trends in Swedish end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Sweden were also reviewed.

DIB-80-06-502 PC$10.00/MF **A01**
Systec Consultants Ltd., Farnborough (England).
Industrial Process Controls in the United Kingdom.
Foreign market survey rept.
Feb 80, 126p
U.S. sales only for 8 months. Available to foreign addressees in Jan 81.

The market research was undertaken to study the present and potential US share of the market in Great Britain for industrial process controls; to examine growth trends in British end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques were also reviewed.

DIB-80-06-503 PC$10.00/MF **A01**
Aktiebolaget Konsulterna for Industri och Handel, Stockholm (Sweden).
The Market for Industrial Process Controls (Saudi Arabia).
Foreign market survey rept.
Mar 80, 74p
U.S. sales only for 8 months. Available to foreign addressees in Jan 81.

The market research was undertaken to study the present and potential US share of the market in Saudi Arabia for industrial process controls; to examine growth trends in Saudi Arabian end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Saudi Arabia were also reviewed.

DSE-3411-T1 PC **A03**/MF **A01**
George Washington Univ., Washington, DC. School of Engineering and Applied Science.
Utility Rate Structures and Distributed Thermal Energy Storage: A Cost/Benefit Analysis. Basic Research Report, October 1978-February 1979.
E. F. Koening, and A. B. Cambel. Feb 79, 44p
Contract ET-78-S-01-3411

This paper examines three alternative methods by which electric utilities might take advantage of distributed thermal energy storage to smooth out their load profiles. These three methods are: time-specific rates, time-invariant rates with subsidized storage, and direct load controls. The optimal form of each of these policies is determined, and formulas indicating the relative desirability of each policy are developed. (ERA citation 05:013715)

ORNL/SUB-79/13521/1 PC **A05**/MF **A01**
Kidder, Peabody and Co., Inc., New York.
Financial Considerations Affecting Implementation of a Large Multiparty Cogeneration Project.
Apr 79, 84p
Contract W-7405-ENG-26

The report identifies problems inhibiting large scale multiparty cogeneration development and suggests means to reconcile the parties' differing interests. The analytical approach adopted for structuring ownership arrangements for a cogeneration project, once engineering studies confirm that the requisite technical advantages exist, is to attempt to resolve three specific issues: (1) identification of the potential participants (industrial customers, the electric utility serving the area, equipment vendors and erectors, design and engineering firms, fuel suppliers and transporters, passive investors, governmental interests, insurance carriers, and others); (2) selection of one or more of the three principal roles which each participant may play: (a) purchaser of project output, (b) provider of other commitments to support financing of the project, and (c) investor in the project; and (3) as to those participants taking an ownership role in the project, deciding whether one participant will act as sole owner or, if joint ownership is selected, deciding which of two structural formats they prefer: (a) an undivided interest approach in which each participant is responsible for and bears the full burden of providing its proportionate share of funding for the project; or (b) a project-entity approach in which each participant owns an interest in a newly organized entity which in turn owns project assets, thereby making the funding of the project the common responsibility of all of the participants. (ERA citation 05:013676)

PB80-168313 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
A Demoeconomic Model of Interregional Growth Rate Differences.
Final rept.,
Jacques Ledent, and Peter Gordon. Oct 78, 31p RM-78-52

Consistent demoeconomic modeling of multiregional systems is an important component of demometrics. It requires the determination of labor force participation, migration and unemployment rates simultaneously and endogenously in the model. The paper presents an important contribution to regional modeling. The authors elaborate on a recently published model of interregional growth and show how the demometric approach alleviates several problems inherent in conventional modeling.

PB80-173602 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Cooperative Development Div.
Shenandoah Valley Poultry Marketing Cooperative,
Phillip F. Brown, Raymond Williams, and Priscilla Salant. Mar 79, 43p ESCS-29

The report examines the potential for poultry producers located in the Shenandoah Valley to establish a marketing cooperative. The report serves as a working tool for the cooperative board, lenders and others who assisted in organizing the Shenandoah Valley Poultry Marketing Cooperative.

PB80-173909 PC **A05**/MF **A01**
Brookings Institution, Washington, DC.
Case Studies of the Impact of Federal Aid on Major Cities - City of Rochester.
Federal aid case studies series paper no. 5,
Sarah F. Liebschutz. Apr 80, 91p MEL-80-06
Contract DL-23-11-77-03
Prepared in cooperation with State Univ. of New York Coll. at Brockport. Dept. of Political Science, and Department of Commerce, Washington, DC.

The report is one of a series of studies of how particular large cities have used federal aid, with emphasis on the 1977-78 'economic stimulus' expansion of the federal grants for public service employment, local public works, and antirecession fiscal assistance. The studies use a common analytic framework to enable comparisons across cities with differing economic, budgetary, and political circumstances. Each of the studies traces growth and uses of federal aid in the 1970s and provides an analysis of program benefits. The effects of federal aid on employment, political power, and government institutions are also discussed.

PB80-173974 PC **A16**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for Policy Alternatives.
Environmental Safety Regulation and Technological Change in the U.S. Chemical Industry.
Final rept.,
Nicolas A. Ashford, Dale Hattis, George R. Heaton, Adam Jaffe, and Sally T. Owen. Mar 79, 375p NSF/PRA-7621368/1
Grant NSF-PRA76-21368

The objective of the report was to investigate the effects of environmental/safety regulation on technological change for purposes of compliance with Federal Environmental/Safety Regulations. Data was collected through questionnaires sent to, and interviews with, representatives of major chemical firms. This data and hypothesis testing were used to form a model of macrobehavior in the areas of social, industrial and economic decision-making and the resulting policy's impact on regulation of the chemical industry. The study concluded that firms are substantially in compliance with regulatory mandates for the specific chemical industries included in the study. Regulation does not present an insuperable technical problem.

PB80-173982 PC **A05**/MF **A01**
National Bureau of Economic Research, Inc., New York.
Models and Variables for Explaining the Location of Production by U.S. Multinational Enterprises.
Final rept.,
Robert E. Lipsey, Irving B. Kravis, and J. Weinblatt. 1 Jun 79, 95p
Contract DL-J-9-K-6-0014

The study was the first part of a project to investigate the interaction between domestic and foreign investment of U.S. firms. The study constructed a formal model of location decisions by U.S. multinational firms which showed how these decisions were affected by quality differences in labor and capital, among countries, differences in levels of taxation, differences in the degree of protection of local markets for both raw materials and capital goods, and differences in the size and growth of local markets.

PB80-174121 PC **A02**/MF **A01**
RDW Systems, Inc., Arlington, VA.
A Special Report on Finance. Volume 1. Executive Summary.
Rept. for Oct 78-Feb 80,
Bud King. Feb 80, 24p MA-RD-930-80058
Contract MA-78-3078
See also Volume 2, PB80-174139.
Also available in set of 3 reports PC E06, PB80-174113.

Volume I summarizes the interim results of a project to analyze the financial performance of the U.S. flag liner industry. Included are the overall capabilities of the Financial Information and Retrieval System (FIRST), with emphasis on the standard and special reports generated by the System. Other major areas described in the report relate to inflation impact on financial statements, return on investment analysis, revenue projections and the preparation of an industry-wide financial profile report.

PB80-174139 PC **A06**/MF **A01**
RDW Systems, Inc., Arlington, VA.
A Special Report on Finance. Volume II. Financial Performance Evaluation Interim Report.
Rept. for Oct 78-Feb 80,
Bud King. Feb 80, 104p MA-RD-930-80059
Contract MA-78-3078
See also Volume 1, PB-174121 and Volume 3, PB80-174147.
Also available in set of 3 reports PC E06, PB80-174113.

Volume II describes the interim results of a project to analyze the financial performance of the U.S. flag liner industry. Included are the overall capabilities of the Financial Information and Retrieval System (FIRST), with emphasis on the standard and special reports generated by the System. Other major areas described in the report relate to inflation impact on financial statements, return on investment analysis, revenue projections and the preparation of an industry-wide financial profile report.

PB80-174147 PC **A04**/MF **A01**
RDW Systems, Inc., Arlington, VA.
A Special Report on Finance. Volume III. Appendices.
Rept. for Oct 78-Feb 80,
Bud King. Feb 80, 73p MA-RD-930-80060
Contract MA-78-3078
See also Volume 2, PB80-174139.
Also available in set of 3 reports PC E06, PB80-174113.

Volume III contains appendices for the interim results of a project to analyze the financial performance of the U.S. flag liner industry. Included are the overall capabilities of the Financial Information and Retrieval System (FIRST), with emphasis on the technical enhancement to FIRST. Also included, are appendices to a 'Return on Investment Study' and an 'Impact of Inflation Study'.

PB80-174410 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Factors Affecting Fiber Consumption in Household Textiles,
Christine J. Hager. Aug 79, 35p

The paper examines trends in household textile consumption and in the use of fibers consumed in household textiles. Factors related to changes in consumption of household textiles are identified and discussed.

PB80-174782 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. International Div.
Financial And Other Constraints Prevent Eximbank From Consistently Offering Competitive Financing For U.S. Exports.
Report to the Congress.
30 Apr 80, 59p ID-80-16

The report discusses Eximbank's role in financing U.S. exports, the international competition it faces, and its ability to meet that competition. The report further discusses a number of alternatives the Congress may wish to consider to help strengthen Eximbank's ability to meet foreign competition.

PB80-175243 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
The Transportation System's Capacity to Meet Grain Export Demand - 1979/80 Outlook,
Floyd D. Gaibler. Oct 79, 29p

Heavy movement of grains and soybeans for export have aggravated the U.S. inland transportation network and port facilities. While the system has met past agricultural demands, it appears that the inland transportation network may be a limiting factor in meeting current grain export demand. With record agricultural exports projected in 1979/80, the transportation system will be under significant pressure to meet the needs of agricultural shippers this fall and winter.

PB80-175284 PC **A05**/MF **A01**
Heien (Dale M.), Healdsburg, CA.
Foreign Trade and the Growth of the Service Economy.
Final rept.,
Dale Heien, and Albert Eckstein. 18 Apr 80, 90p
Contract DL-J-9-K-8-0003

The study analyzed the major factors which have contributed to the growth of employment in the service sector of the U.S. economy. For the purpose of the study, particular emphasis was placed upon the influence of foreign trade and investment and labor demand on the rate of growth in the service sector. The authors found that the primary factor contributing to employment growth in services has been the dramatic increase in government expenditures, particularly at the state and local level. The authors also found that while the growth of the service sector had few direct consequences for international trade, it did lead to increased exports in areas such as financial services and higher education.

PB80-175391 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Food Processing Lags and the Farm-to-Retail Price Spread,
Paul C. Westcott, and Jarus Kevin Quinn. Oct 79, 15p

In the Department of Agriculture's food price monitoring effort, the USDA's market basket concepts have proved to be useful to measure margins. However, the market basket statistics do not consider farm-to-retail time lags in the derivation of price spreads. The determination of the lag lengths and weights is the primary focus of the paper. For each market basket commodity group, a lag structure is estimated for the retail price response to changes in farm value. These statistically estimated lags are used to derive a new farm value index. Because it incorporates lags, this constructed farm value index can be compared with the retail cost series to calculate an alternative farm-to-retail price spread which is arguably a more realistic measure of marketing margins.

PB80-175565 PC **A06**/MF **A01**
New Hampshire Univ., Durham. Center for Industrial and Institutional Development.
University Center for Technical Assistance Program at the Center for Industrial and Institutional Development, University of New Hampshire, Durham, New Hampshire.
Final rept. 1 Sep 78-31 Aug 79.
Mar 80, 106p EDA-80-061
Grant EDA-01-6-01537-1
See also report dated Jul 78, PB-287 614.

The objectives of the University Center for Technical Assistance Program are to provide management and engineering assistance in order to foster economic development in needed areas of the State of New Hampshire. Services are offered through four program elements as listed in the report. A unique advantage of this program is the involvement of the faculty and students of the School and College. The University Center's objective and policy is to provide free management and technical assistance to selected individuals, companies and communities throughout New Hampshire in order to further the economic development of the State and to create or stabilize employment potentials.

PB80-175813 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of International Trade. Volume III, Number 9, May 5, 1980.
Bi-weekly pub.
5 May 80, 50p
See also Volume 3, Number 7, PB80-161565.
Paper copy available from Supt. of Docs.

Contents:
- Japan--is the market open;
- OPIC places higher priority on exports;
- Foreign industrial production advances in February;
- Economic highlights;
- U.S. drug industry shipments to expand;
- Business outlook abroad;
- Worldwide business opportunities.

PB80-176019 PC **A07**/MF **A01**
Rochester Univ., NY. Coll. of Arts and Science.
Taxation and Multinational Firm Behavior: Some Evidence from Puerto Rico.
Final rept.,
Eric W. Bond. 17 Apr 80, 128p
Contract DL-J-9-K-7-0001

The purpose of the research was to develop a model to evaluate the importance of tax rates as a factor in the location decision to multinational firms, and to study the specific effects of the tax exemption program in Puerto Rico. The conclusion from this model was that foreign countries could use low foreign tax rates to attract investments by multinationals and that the potential to use tax rates to attract investment was much greater for Puerto Rico because of its special relationship with the United States.

PB80-176209 PC **E04**/MF **E04**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
The Economic Impact Model.
Final rept.
c1979, 80p RR-79-8

An initial version of the economic impact model (IMPACT) was developed at the Siberian Power Institute in Irkutsk. The model was originally designed to study the influence of the development of the energy sector on energy-related sectors of the national economy. Subsequently, the model was brought to IIASA where it was revised to focus on the identification and comparison of long-term regional and global energy strategies in the transition period of 15 to 50 years from now. The possible influence of any given energy strategy on the economy is evaluated in terms of capital investment, manpower, materials, and natural resources that are needed to develop not only the energy supply system (ESS) but also the energy related sectors of the economy. This report describes IMPACT as it exists at IIASA, explains the computer program, and includes a user guide for implementing this methodology. (Copyright (c) 1979, International Institute for Applied Systems Analysis.)

PB80-176217 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
A Normative Model of Rural-Urban Development and Optimal Migration Policy.
Final rept.
c1979, 46p RR-79-5

Agricultural development policies influence patterns of internal migration and population distribution directly and indirectly. The reverse is also true. Hence, a nation's agricultural development policy should be consistent with its population distribution policy. Accordingly, the policy field to be investigated must be extended to include side effects and secondary consequences in these interdependent spheres. Methodological research and a number of case studies are envisaged to deal with this problem in the Food and Agriculture Program, in the Human Settlements and Services Area, and in the Regional Development Task. This paper is among the first of such studies and should be regarded as a methodological study to determine whether a computerized regional model can be constructed to improve the planning of rural-urban development, employment, and migration policy. (Copyright (c) 1979, International Institute for Applied Systems Analysis.)

PB80-176316 PC **A11**/MF **A01**
Technical Assistance Research Program, Inc., Washington, DC.
Consumer Complaint Handling in America: Final Report,
John A. Goodman, Marc A. Grainer, and Elizabeth C. Megna. Sep 79, 231p TARP-79-1
Grant DHEW-OS-74-292

The purpose of the study was to investigate the complaint-handling practices used by government, business, and private voluntary groups to resolve consumer problems, the adequacy of these systems, and to recommend improvements. This volume reports the study's findings and recommendations, and provides a 68-page How-To-Do-It Manual for implementing cost-effective complaint-handling procedures.

PB80-177686 PC **A09**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Cooperative Management Div.
The Changing Financial Structure of Farmer Cooperatives.
Farmer cooperative research rept.,
Nelda Griffin, Roger Wissman, William J. Monroe, Francis P. Yager, and Elmer Purdue. Mar 80, 180p FCRR-17

Combined assets of 5,795 farmer marketing and supply cooperatives amounted to $18.6 billion at the close of fiscal year 1976. Equity capital represented 42 percent, borrowed capital 33 percent, and other liabilities 25 percent of total assets. The report analyzes the financial structure of farmer cooperatives, including amounts, types and sources of equity and borrowed capital. Sales and other operating income and amounts and distribution of net savings and losses are also covered. Data are presented by major function, principal products handled, geographic location and income tax status of the cooperatives.

PB80-177850 CP **T02**
Foreign Agricultural Service, Washington, DC. Data Systems Div.
Foreign Production, Supply and Distribution of Agricultural Commodities.
Data file,
Richard J. Cannon, Eldon C. Hildebrandt, and Nancy O. Palmerino. 1979, mag tape USDA/DF-80/001
Supersedes USDA/DF-79/007, PB80-100647.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The file contains foreign production, supply and distribution information. This includes area harvested, production, beginning stocks, total imports, total exports, total domestic use and ending stocks. Commodity coverage includes grains, rice, dairy, poultry, livestock, cotton, coffee, sugar, cocoa, potatoes, onions, garlic, tobacco and cigarettes. The most recent year reported is 1980. Complete supply and distribution data are not always available. When only production figures are reported, this will be indicated by a 'Production Only' flag in the record.

PB80-178437 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.

Developing Markets for Fish Not Traditionally Harvested by the United States: The Problems and the Federal Role.
7 May 80, 72p CED-80-73

Opportunities exist for the U.S. fishing industry to make greater use of fish species not traditionally harvested by it. Although several different programs can be adopted to further promote the development of such species, a regional approach led by industry, with Federal and State support, appears to be one of the best strategies. Industry must participate actively, and the Federal Government can play an important role by providing financing, consumer education, and quality control programs and by helping to ease trade barriers.

PB80-182520 PC **A05**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Foreign Investment in the U.S. Food and Agricultural System: An Overview.
Agricultural economic rept.,
Kenneth R. Krause. May 80, 94p AER-456

Foreign direct investment in U.S. firms and real estate about doubled between 1973 and 1978. In response, several studies were commissioned by the Executive Branch to ascertain the level and influence of foreign investment and to require reporting of foreign investment in U.S. agricultural land. Most of the increase in direct investment came from Western Europe and Canada, not from oil-exporting countries. Foreign investors do not have dominant control of firms throughout the input, production, marketing, and processing of any one food item.

PB80-182561 PC **A08**/MF **A01**
Yale Univ., New Haven, CT. School of Forestry and Environmental Studies.
The Social and Environmental Consequences of Current Trends of Non-Metro Growth: An Annotated Bibliography.
Final rept.,
J. Kathy Parker, and Joyce K. Berry. 1 Oct 79, 157p
Contract EQ9AD289

One of the patterns of shifting population in recent years is toward growth in nonmetropolitan areas. A variety of factors contribute to these growth trends. The bibliography concerns the social and environmental impacts of this growth on nonmetro America. More specifically, the report (1) discusses the methods and data sources of the review of current research; (2) provides an analysis of the literature with additional comments from researchers obtained through personal communications; (3) offers recommendations of topics for further investigation; (4) includes annotations of recent literature; and (5) provides lists of researchers, agencies, etc. that can be contacted for more details.

PB80-183148 PC **A05**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Supplement for 1980 to Statistics on Cotton and Related Data, 1960-78,
Mildred V. Jones. Apr 80, 96p STATISTICAL BULL-617-SUPPL
See also PB-294 007.

The bulletin is the first annual supplement to Statistical Bulletin No. 617 published in March 1978. These statistics on cotton range from 1974-78 and include preliminary data for 1979.

PB80-184807 PC **A11**/MF **A01**
Northwestern Univ., Evanston, IL. Center for Interdisciplinary Study of Science and Technology.
The U.S. Consumer Electronics Industry and Foreign Competition.
Final rept.
Michael Radnor, Barbara Collins, Liam Fahey, Robert Beam, and Bala V. Balachandran. May 80, 240p EDA-80-067
Grant EDA-06-26-07002-10
See also Executive Summary, PB80-184815.

The full report concludes the first phase of a two phase study of the United States consumer electronics industry. The initial impetus for the study was provided by an increasing concern for the economic viability of certain subsectors of the industry (e.g., color televison, CB radios) on the part of the participants in these industry segments and the U.S. government. The study diagnoses the key reasons for the problems faced by the U.S. manufacturers and the success of imported products in a number of sectors of the industry, and recommends possible strategies for U.S. industry participants and the U.S. government to reverse this situation.

PB80-184815 PC **A04**/MF **A01**
Northwestern Univ., Evanston, IL. Center for Interdisciplinary Study of Science and Technology.
The U.S. Consumer Electronics Industry and Foreign Competition. Executive Summary.
Final rept. 1 Oct 78-1 Mar 80,
Michael Radnor, Barbara Collins, Liam Fahey, Robert Beam, and Bala V. Balachandran. May 80, 62p EDA-80-068
Grant EDA-06-26-07002-10
See also PB80-184807.

The summary report concludes the first phase of a two phase study of the United States consumer electronics industry. The initial impetus for the study was provided by an increasing concern for the economic viability of certain subsectors of the industry (e.g., color television, CB radios) on the part of the participants in these industry segments and the U.S. government. The study diagnoses the key reasons for the problems faced by the U.S. manufacturers and the success of imported products and recommends possible strategies for U.S. industry participants and the U.S. government to reverse this situation.

PB80-184989 PC **A05**/MF **A01**
Council of State Planning Agencies, Washington, DC.
The Working Poor: Towards a State Agenda.
Rept. no. 4 (Final),
David M. Gordon. c1979, 98p ISBN-0-93482-03-5, EDA-ERD-80-148
Contract EDA-OER-553-G-78-21, Grant EDA-99-7-13360-1
See also PB80-184971. Library of Congress catalog card no. 79-67382.

The report states that many state government officials justify their approach to economic development on either or both of two grounds: (1) that tax relief and business subsidies will actually help generate jobs and reduce employment problems; and (2) that there are no other alternatives to public support for private business in the employment area. This essay disputes that policy orientation. It argues that state government relief and subsidies for private business will not reduce and may even intensify many state employment problems. It also argues that other approaches, centered around public support for and management of non-profit, locally-controlled community economic development programs, are possible and hold much greater promise for moderation and eventual solution of current employment problems. It argues, in short, that a careful analysis of state employment problems suggests that need for a dramatic re-orientation of state government policies toward economic development.

PB80-186034 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Economics Applied to Standards: A Guide to the Literature.
Final rept.,
Stephen F. Weber, and Barbara C. Cassard. Apr 80, 93p NBSIR-80-2015

The report provides a guide to the available literature on the application of economics to the analysis of standards and standardization. One hundred eighty-nine relevant articles, reports, and books were found and organized into four major categories of interest: (1) General methods of economic evaluation; (2) Economics useful for standards analysis; (3) Evaluation of specific developed standards; and (4) Economics applied to the development of standards. The significant findings within each of these categories are briefly discussed in the text. The annotations which accompany the bibliographical entries provide more detailed information. The text includes a discussion of the approach followed in the literature search. An author index is also provided.

PB80-810765 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Consumer Products and Consumer Affairs, 1977-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-May 80,
Jack E. Jones. May 80, 204p
Supersedes NTIS/PS-79/0552 and NTIS/PS-78/0537.

The annotated bibliography contains references on consumer product safety; government laws and regulations concerning product standards, packaging, and labeling, sales and product-related services, and warrantees; consumer finance and prices; and consumer problems related to products and services. Reports specifically excluded are those resulting from the Federal Trade Commission advertising substantiation program, and from the motor vehicle safety defect recall campaigns. Reports concerning automobile safety devices and crash tests, health care or health education are also excluded. (This updated bibliography contains 198 abstracts, 37 of which are new entries to the previous edition.)

PB80-928003 PC **E09**/MF **A01**
Central Intelligence Agency, Washington, DC.
National Basic Intelligence Factbook.
Jan 80, 247p GC-BIF-80-001
Supersedes NTISUB/E/280-012.Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents. This series offers a reduction in price as a Standing Order, PB80-928000.

The National Basic Intelligence Factbook is a basic reference document which presents selected information for more than 180 political entities. The information appearing in the publication is organized by country. Each country statement includes a small orientation map and separate headings on land, people, government, economy, communications, and defense forces. Facts (narrative or statistical) are offered in succinct, telegraphic style and format. Data are the latest available, dated, and qualified as to accuracy when appropriate. The Factbook is published semiannually by the Central Intelligence Agency. The data are provided by components of the Central Intelligence Agency, the Defense Intelligence Agency, and the Department of State. The publication is prepared for the use of U.S. Government officials, and its format, coverage, and contents are designed to meet the specific requirements of those users.

PB80-928206 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
China: International Trade Quarterly Review, Fourth Quarter, 1979.
Research paper.
May 80, 36p ET-CIT-80-003
See also PB80-928203.Color illustrations reproduced in black and white.
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928200.

The report is the fourth in a series of quarterly reports on China's foreign trade. This review includes, in addition to fourth quarter 1979 export and import estimates, a discussion of major trade developments in 1979. Chinese imports remained stagnant in fourth quarter 1979; exports continued their strong growth. For the year as a whole, both imports and exports were up sharply and the trade deficit increased; purchases of whole plants and technology cooled; agricultural trade was up sharply and chemical fertilizer imports fell.

SERI/RR-352-357 PC **A05**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Market for Ethanol Feed Joint Products.
D. Hertzmark, and B. Gould. Oct 79, 82p
Contract EG-77-C-01-4042

This report presents results of econometric estimations and mathematical simulations of markets for joint feed products of motor ethanol. The major

issues considered are the nature of current market price relationships, effects on prices, including feed substitutes prices, and effects of demands for increased use of distillers' grains and gluten meal. The econometric section shows that soybean meal was by far the dominant force in the pricing of the two products. However, neither one could be adequately explained without the inclusion of corn in the estimating equations. Later research shows that this was due to the importance of both feeds for metabolizable energy as well as for protein in livestock diets. Current ration formulations would require some discounting of the value of the protein content of the two feeds. Careful siting of the ethanol facilities, and flexible design of the plants so that a maximum number of products may be extracted from the feedstock, seem necessary. Finally, the analysis indicates that substitution in animal diets of these joint products for the corn or milo used originally requires that additional energy be supplied to the animal by some type of forage crop. This implies that additional land may be required for energy production, for such marginal crops as hay and alfalfa, rather than for row crops. (ERA citation 05:012546)

SHR-0002907 PC A03/MF A01
Congressional Budget Office, Washington, DC.
Proposition 13: Its Impact on the Nation's Economy, Federal Revenues, and Federal Expenditures.
Peggy L. Cuciti, Peter Karpoff, Nancy B. Morawetz, Cornelia J. Motheral, and Robert D. Reischauer. Jul 78, 45p

Proposition 13 is an amendment to the California Constitution that limits local property rates and makes it difficult to increase other State and local taxes. The report discusses the impact of this Proposition on the Nation's economy, Federal revenues, and Federal expenditures. It appears that Proposition 13 will have an insignificant effect on the nation's economy. Benefits include a property tax cut which will stimulate economic activity, but growth will be slow because most revenue gain will be retained by businesses. Also, the Proposition will bring about a lower price level because property taxes are a part of the housing component of the Consumer Price Index (CPI). The cutbacks in State and local spending, however, should depress the economy. Overall, Proposition 13 will cause marginally lower levels of real economic activity through the first half of calendar year 1979 and marginally higher levels of real activity by mid - 1980, an employment loss of about 60,000 persons by the end of 1978 that will diminish gradually in size, and a reduction in the CPI of 0.2 percent by the end of 1978 and 0.4 percent by mid - 1980. Federal revenues should increase by about $600 million in fiscal year 1979 and $900 million in fiscal year 1980 as a result of two offsetting factors: (1) individual and business taxpayers will have smaller property tax deductions to claim on their Federal tax returns, and consequently, Federal corporate and individual income tax collections will rise; and (2) the impact of Proposition 13 on the price level and on the level of economic activity will lower the current dollar value of national income causing Federal tax collections to be lower. Total Federal expenditures will not be significantly affected by Proposition 13. While expenditure cutbacks by California and its localities will lead to layoffs that could increase spending for transfer programs, the impact of the property tax cut on the price level will lower anticipated Federal spending for social security and other programs whose spending levels are tied directly or indirectly to the CPI. Expenditure cutbacks could lead to lower Federal Spending by reducing California's participation in Federal grant programs, with a reallocation of such funds to other States at a later date. Thus, while the level of Federal spending in the near term might be lower than would be the case if Proposition 13 had not been adopted, it could be higher after the funds are reallocated. As many of the conditions responsible for the passage of Proposition 13 are not conditions unique to California, similar taxpayer revolts could occur elsewhere. However, public officials could attempt to preempt such revolts by providing tax relief before required to do so by voters. Unless the reductions in taxes are at least twice as large as the accompanying slowdown or cut in expenditures, the net effect is likely to be a slowdown in economic activity and employment growth. Tables accompany the text.

5D. History, Law, and Political Science

AD-A083 370/7 MF A01
Foreign Technology Div Wright-Patterson AFB OH
Down with the New Tsar.
17 Aug 79, 101p Rept no. FTD-ID(RS)T-0938-79
Edited trans. of mono. Down with the New Tsar, China, 1969 p1-75.
Availability: Microfiche copies only.

No abstract available.

PB80-170632 PC A04/MF A01
Kansas Water Resources Research Inst., Manhattan.
A State of Knowledge on Indian Water Rights in Kansas.
Project completion rept.,
D. Cheryl Collins. Feb 80, 51p W80-04503, OWRT-A-093-KAN(1)

Much uncertainty surrounds Indian water rights in Kansas since they may be in conflict with State given rights to water. The ever increasing shortage of water in the arid areas of Kansas is forcing the State to clarify Indian water rights to avoid continuing and future conflicts. Kansas water law subscribed to both riparian water rights and to appropriation which provides all users as much water as they need toward a beneficial use. If the water supply is not adequate then those 'first in time' are 'first in right'. This leads to problems of whether or not Indian reserves were 'first in time'. Indian land tenure in Kansas is discussed for the original tribes as well as those brought to Kansas reservations from other states.

PB80-174246 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. Economic Development Div.
Substate Regionalism: A Review of the Current Issues,
Jerome M. Stam. Nov 79, 34p

Some of the most important current issues pertaining to multicounty substate regionalism are reviewed. This includes an examination of such problems and issues as Federal control, council weaknesses, representation, lack of State and local constituencies, powers and functions, generalists and functionalists, public distrust of reform, and interest group and political support. The various major current approaches to reform are outlined as a background. The growth of the substate regionalism movement and the reaction to it are traced.

PB80-175920 PC A10/MF A01
State Legislative Leaders Foundation, Milwaukee, WI.
Institutional Change and Legislative Performance: A Study of Changes in Two State Legislatures by the State Legislative Leaders Foundation,
C. O. Davis. 10 May 79, 204p NSF/RA-790100
Grant NSF-ISP77-14688

The first stage of a new State Legislative Leaders Foundation (SLLF) understanding of legislative change and its impact upon performance is reported. It represents a comprehensive, detailed examination of the effects of legislative change in the states of Iowa and Wisconsin over twelve years. The project seeks to discern if there were the expected improvements, differentiating between the effects of various types of reforms, and to assess the impact of change upon the effectiveness of legislatures and policies enacted by their legislators. It combines both theoretical and applied interests, but focuses on the latter. A macrolevel theory is tested regarding the effects of change in a legislature's organization on the subsequent performance of the legislature in its processing effectiveness of policy decisions and the nature of policy decisions made by the legislature. The effects of policy decisions and the outcomes of these policies also are investigated. Included are a legislative processing model, research strategy, data collection, change in the legislatures 1967-1978 bivariate and multivariate analyses, policy area case studies, and utilization of the completed part of the project.

5E. Human Factors Engineering

AD-A083 101/6 PC A02/MF A01
Army Medical Intelligence and Information Agency Fort Detrick MD
Resolving Power of the Eye Using Color Cathode-Ray Tubes. (Pouvoir Separateur de l'Oeil sur Tube Cathodique Couleur),
G. F. Santucci. 24 Mar 80, 16p Rept no. USAMIIA-K-9921
Trans. of Operational Helicopter Aviation Medicine (Paris) p39-1-39-10 Dec 78, Rept no. AGARD-CP-255, AD-A065 234.

No abstract available.

AD-A083 218/8 Not available NTIS
Flying Personnel Research Committee London (England)
Visual Target Acquisition and Tracking Performance Using a Helmet-Mounted Sight,
G. R. Barnes, and G. P. Sommerville. Apr 78, 10p Rept no. FPRC/1371
Availability: Pub. in Aviation, Space, and Environmental Medicine, v49 n4 p565-572 Apr 78 (No copies furnished by DTIC/NTIS).

No abstract available.

PB80-183015 PC A05/MF A01
National Inst. for Occupational Safety and Health, Rockville, MD.
Criteria for a Recommended Standard - Working in Confined Spaces.
Criteria document.
Dec 79, 78p DHEW/PUB/NIOSH-80-106

The report recommends procedures set forth as a means of protecting the health, and significantly reducing accidental injury and death associated with entering, working in, and exiting from confined spaces. The standard is designed not only to make the confined space safe for the worker, but also to make the worker cognizant of the hazards associated with this work area and the safe work practices necessary to deal with these hazards.

5F. Humanities

AD-A083 235/2 PC A05/MF A01
P/Ra Research Inc East Meadow NY
Cultural Resource Predictive Model Literature and Records Search for Conesus Lake N.Y.
Final rept.,
Martin Murphy, and Annette Silver. Feb 80, 89p
Contract DACW49-79-C-0091

This is a report on the literature and records search and the development of a prehistoric site prediction model for Conesus Lake, New York. Conesus Lake is located in the eastern half of Livingston County approximately 35.5 km south of Rochester, New York. Nineteen prehistoric and/or contact sites have been identified in the project area and there are no historic sites (structural or archaeological) of significant integrity. The predictive models used in this investigation distinguished zones in which the probability of additional, prehistoric sites existing ranged from poor to moderate. Recommendations for further cultural resources mangement of the Conesus Lake project area are presented. (Author)

AD-A083 284/0 PC A04/MF A01
Cleveland State Univ OH Dept of Anthropology
Cultural Resource Survey for Euclid Creek, Ohio,
John Edward Blank. 25 Mar 80, 53p
Contract DACW49-79-C-0092

Review of the historical literature, manuscript and map sources, and interviews fail to indicate the presence of any known historical sites within the project area. Review of the archaeological literature, records of the Regional Ohio Historic Preservation Office, the site files of the Cleveland Museum of Natural History and Cleveland State University Archaeological Laboratory fail to reveal any known archaeological sites within the project area. Geological considerations suggest that the area was open for human occupation only after the retreat of the Wisconsin Glacier and the drainage of the Lake Erie basin to the Algonquin Stage

sometime after 6200 years B.C. Ecological considerations would suggest that the area was suitable for human occupation following 6200 B.C. up until the time of Anglo-European settlement at 1797-8 A.D. Walk-over surface survey combines with extensive sub-surface test excavations failed to reveal any evidence of either historic or prehistoric cultural resources in the area. The extent of the presently available knowledge indicates that the proposed construction will not endanger or affect any known or suspected cultural resources of either the prehistoric or historic time periods. (Author)

INIS-mf-5208 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Phototransfer Method of Determining Archaeological Dose of Pottery Sherds.
R. Sasidharan, C. M. Sunta, and K. S. V. Nambi. 1978, 5p
U.S. Sales Only.

The method of PTTL (phototransfer thermoluminescence) dating works satisfactorily over a very wide range of archaeological doses and the upper limit seems to be around 4000 rads. The first TL peak generally occurs at 65deg C or 100deg C in different varieties of quartz and both seem to be satisfactory for PTTL dating if the reading procedure is standardised to take care of the fast fading of these peaks at room temperature. (Atomindex citation 10:477939)

PB80-175961 PC **A99**/MF **E04**
Museum of New Mexico, Santa Fe. Lab. of Anthropology.
Archeological Excavations at Pueblo del Encierro, LA 70, Cochiti Dam Salvage Project, Cochiti, New Mexico, Final Report: 1964-1965 Field Seasons. Parts I-III.
Final rept.,
David H. Snow. Apr 76, 1064p LAB OF ANTHROPOLOGY NOTES-78
Contract HCRS-C3580(66)

This report describes the excavated remains of a prehistoric pueblo village in the central Rio Grande Valley of New Mexico. The village contained 198 ground-floor rooms, 9 kivas, 7 rectangular pit-rooms, and 2 circular pit-houses, whose associated cultural debris suggests a continuous occupation of LA 70 from A.D. 1275 to 1550. Eighteenth century occupation of the area, presumably by Spanish Colonial people, was indicated by habitation of 9 of the prehistoric rooms of the pueblo and by construction of small ranchos. A large number of Rio Grande glaze ceramics recovered from LA 70 provided opportunities for a variety of detailed analyses. Correlations between local and regional ceramic developments and developments with tree-ring dates and architectural details provided the outlines of growth of LA 70 from a small community of pit-houses and pit-rooms, through the development by accretion during the period ca, A.D. 1350-1500, of a large hollow-square or enclosed plaza-type pueblo.

5H. Man-Machine Relations

AD-A083 090/1 PC **A07**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Industrial Engineering and Operations Research
An Evaluation of the Effect of Spot Wobble Upon Observer Performance with Raster Scan Displays.
Technical rept. 11 Sep 75-11 Jun 77,
Harry L. Snyder, William S. Beamon, James C. Gutmann, and Eric D. Dunsker. Jan 80, 129p AMRL-TR-79-91
Contract F33615-76-C-5022

A television image is formed by a series of parallel luminous lines called a raster. The visual prominence of the raster structure has been shown to interfere with the extraction of information from the image. However, the raster may be suppressed experimentally by a deflection process called spot wobble. Experiments were conducted to determine the effects of raster structure suppression on visual sine-wave contrast sensitivity thresholds, dynamic target acquisition performance using noise-free and noise-degraded imagery, and alphanumeric recognition performance using noisy and noise-free static displays. Results of the dynamic experiment indicate raster structure suppression and improvements in sine-wave threshold sensitivity are correlated and that a suppressed raster significantly improves target acquistion performance for noise-free conditions. Results of the static experiment were inconclusive, as no spot wobble effect was obtained, although display noise had a significant effect upon search time. Significant correlations with the modulation transfer functions area (MTFA) image quality metric were obtained, although the correlations were neither large nor consistent enough to be strongly advocated for detailed design evaluations.

AD-A083 160/2 PC **A04**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
An Application of Human Factors Concepts to an Interactive Computerized Personnel Record-Keeping System.
Research rept.,
Thomas M. Granda. Jan 80, 63p Rept no. ARI-RP-1233

This report describes a 'hands-on' demonstration that illustrates how human factors principles can be applied to the design of the human-computer interface and the operational procedures of an interactive, real-time Army personnel record processing system. The Standard Installation/Division Personnel System (SIDPERS) was identified as a typical record-processing system suitable for conversion to an interactive computer system. Four SIDPERS transactions (Duty Status, Departure, Arrival, and Grade Change) were selected as representative tasks for demonstrating the application of behavioral principles. The demonstration was programmed on the PLATO (Programmed Logic for Automatic Teaching Operation) system. The demonstration focused on the interactions between the computer and both an experienced and an inexperienced processing clerk of a unit. The demonstration also displayed interactions between a unit supervisor and the computer and between SIDPERS personnel and the computer. The demonstration capabilities included error detection and correction, definition of terms, variable input format, and efficient information retrieval.

AD-A083 444/0 PC **A03**/MF **A01**
Naval Weapons Center China Lake CA
Effects of Image Exposure Time and Size on Ship Identification on Television.
Technical publication,
Hugh O. Whitehurst, and Jeffrey D. Grossman. Feb 80, 32p Rept no. NWC-TP-6169

Human operators' ability to identify a ship on a television display was tested in a simulation experiment. The primary objective was to measure how well the operators could identify a single target from among several alternatives with different image exposure times and image sizes. A second objective was to evaluate two response strategies. In one the observer would view all ships in a set before making an identification response. In the other, he would designate the target when it was first seen. Image size had a far stronger effect on identification performance than exposure time. Identification probabilities were low at the smallest image size (7 TV lines) at all exposure times tested. With 10 or 13 lines across the image, the percentage of correct identifications increased between 2 and 4-sec exposure times, but the increase was slight between 4 and 6 sec. Giving the observer the opportunity to view all ships in the set before responding did not improve performance. The data suggests that exposure times should be at least 4 sec to maintain a high level of performance. Correct identifications can be made at the time the target is on the display (whether the target appears first or last in the set) without viewing all ships in a set. (Author)

N80-21983/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Principles for Classification of Work Load for Women.
A. O. Navakatikyan, A. P. Okhrimenko, A. N. Karakashyan, and V. A. Buzunov. Mar 80, 9p NASA-TM-76084
Contract NASW-3198
Transl. Into English from Gig. Tr. Prof. Zabol. (USSR), No. 2, Jul. 1979 p 10-14. Transl. By Scientific Translation Service, Santa Barbara, Calif.

In an attempt to develop guidelines for classification by degree of intensity of various kinds of physical work performed by women, the effects of different work loads on women as compared to men were studied under industrial and experimental conditions, including response of the cardiovascular and respiratory systems to specified physical exercises of increasing intensity. Physiological criteria for assessing female labor in terms of intensity are proposed.

5I. Personnel Selection, Training, and Evaluation

AD-A083 043/0 PC **A06**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
Tri-Service Literacy and Readability: Workshop Proceedings.
Final rept.,
Thomas E. Curran. Mar 80, 103p Rept no. NPRDC-SR-80-12

Contents: A Possible Framework for the Study of Readability, The Practical Application of Readability/Comprehensibility Research to the Production of More Usable Military Technical Materials, Computer-Stored Navy Word Lists for Readability Analysis and Literacy Training, Validation of the Navy Readability Indices, Measurement of Technical Reading Ability and the Difficulty of Technical Materials, Synopsis of AFHRL Literacy Research Projects, An Attempt to Communicate While Training and Assessing Without Serendipity, Buying Readability--Specifications and Standards, Reading Problems within the Army, Department of the Army Efforts to Improve Readability of the Administrative Publications, Technical Graphics Comprehensibility Assessment, Recapitulation, Amplification of Tri-Service Readability Workshop Presentations Relative to Communicating with the Reader Population.

AD-A083 091/9 PC **A05**/MF **A01**
Systems Research Labs Inc Dayton Ohio
Sampling Methodology Developed for Preliminary SACDEF Study.
Technical rept. Jun 76-Jun 77,
Mark S. Hoffman, and Gerald P. Chubb. Jan 80, 85p AMRL-TR-78-33
Contract F33615-75-C-0127

A survey of the combat-ready SAC navigator/radar navigator crew force for the B-52G/H fleet was conducted in July 1976. The data reported relate to variables associated with crew experience (age, rank, flying hours, instructor status, months together as a team, etc.). Team variables were derived from the data on individual crew members and an intercorrelation table was computed. Since these data were to be used for selecting a sample of crews from G model bases not having an Automated Offset Unit by February 1977, the overall crew force was broken down into four subgroups (G vs. H bases, with and without AOU) for some analysis. An analysis of variance was performed using total flying hours as the dependent variable. Crew types (ready, lead, and select) were found to have statistically significant differences in flying hours for all contrasts. Bases which had AOU equipped G model aircraft were found to have a significantly larger number of total flying hours. Failure to reject the null hypothesis for non-AOU equipped G model bases was interpreted to imply that the sample from this sub-population would be representative of the overall crew force of total flying hours. (Author)

AD-A083 194/1 PC **A05**/MF **A01**
ORINCON Corp La Jolla CA
Markov Resource Utilization Decision Aid for Air Force Recruiting Service.
Final rept.,
Michael H. Moore, Nancy D. Anderson, Thomas A. Adams, and Larry T. Looper. Mar 80, 98p AFHRL-TR-80-4
Contract F33615-78-C-0043

This technical report presents a recruiting resource and goal allocation decision model devel-

oped for the Air Force Recruiting Service. The model uses a Markov probability process to determine the optimum use of recruiting effort and advertising funds to obtain desired recruit input levels. Probability statements are made concerning the likelihood of meeting objectives. The model has considerable variability in user input and output and non-optimum goals can be examined. (Author)

AD-A083 232/9 PC **A09/MF A01**
McDonnell Douglas Astronautics Co-St Louis MO
Study Skills Package: Development and Evaluation.
Final rept.,
Jacqueline L. Dobrovolny, Barbara L. McCombs, and Wilson A. Judd. Mar 80, 191p AFHRL-TR-79-43
Contract MDA903-77-C-0144, ARPA Order-3329
See also Rept. no. AFHRL-TR-79-14 dated Jul 79, AD-A074 020.

Materials contained within this report are designed to diagnose and remedy student study skill deficiencies in the areas of (a) reading comprehension, (b) memorization, (c) test talking, and (d) concentration management skills. The study skills materials were separately packaged to allow partial or total remediation in the four areas, as required, and each package incorporated concepts of active student involvement in the material to be learned (e.g., mnemonic techniques, behavioral self-control strategies). In addition, materials and procedures used in an Instructor Orientation and Training Workshop are included. A package was designed to provide instructors using computer-managed instruction with basic diagnostic and tutorial skills required to assist in their effective use of the study skills materials and to help them transition into their new role as facilitator of student learning. Evaluation data from an implementation of the student and instructor skill training materials in the Air Force Advanced Instructional System suggest that consistent student training time reductions and performance gains can be obtained by the use of the study skills materials. The Study Skills Questionnaire was also found to be a reliable and valid measure of student skills in the four areas, and reliably discriminated students performing satisfactorily versus poorly in the Advanced Instructional System technical training environment. Furthermore, the Instructor Orientation and Training was found to assist in the efficient remediation of student study skill deficiencies and to contribute to improved instructor perceptions of their role in computer-managed instruction. (Author)

AD-A083 432/5 PC **A11/MF A01**
Stanford Univ CA Dept of Computer Science
Transfer of Rule-Based Expertise through a Tutorial Dialogue.
Doctoral thesis,
William John Clancey. Sep 79, 246p Rept nos. STAN-CS-79-769, TR-1
Contract N00014-79-C-0302, ARPA Order-3697

This dissertation describes an intelligent, computer-aided instructional (ICAI) program, named GUIDON, with capabilities to carry on a structured case method dialogue, generate teaching material from production rules, construct and verify a model of what the student knows, and explain expert reasoning. The principle objective of this research has been to convert MYCIN, a knowledge-based consultation program, into an effective instructional tool. GUIDON combines the subject matter knowledge of the consultation system with tutorial discourse knowledge, while keeping the two distinct. MYCIN-like knowledge-based consultation programs are designed to provide expert-level advice about difficult scientific and medical problems. High performance is attained by interpreting a large, specialized set of facts and domain relations that take the form of rules about what to do in a given circumstance. Such a rule base is generally built by interviewing human experts to formulate the knowledge that they use to solve similar problems in their area of expertise. While it is generally believed that these programs have significant educational potential, little work has been done to evaluate the problems of realizing this potential.

AD-A083 435/8 PC **A03/MF A01**
RAND Corp Santa Monica CA
Veteran Status and Civilian Earnings.
Interim rept.,
Dennis N. De Tray. Mar 80, 49p Rept no. RAND/R-1929-ARPA
Contract MDA903-78-C-0084, ARPA Order-3478

This research is concerned with the causes of civilian earnings differences between veterans and men with no military service experience. Controlling for such background characteristics as years of schooling, age, and residential locations, veterans receive higher market wages, on average, than do men who have never served in the military. The research presented in this report is an analysis of the causes of this 'veteran premium,' and specifically, an assessment of the fraction of that premium related directly to military service and the fraction due to factors that are correlated with, but not causally related to, service in the military. (Author)

AD-A083 440/8 PC **A04/MF A01**
Human Resources Research Organization Alexandria VA
Evaluation of a Proposed Combat Pistol Qualification Training Program.
Consulting rept.,
William L. Warnick, and John D. Engel. Sep 70, 52p
Contract DAHC19-70-C-0012

This report compares the quick-fire method of pistol training to the standard aimed-fire method to evaluate their relative effectiveness. The two methods were tested on Tables II and III of the Standard Firing Course and Tables I through V of the Combat Pistol Qualification Course. Information obtained provided a basis for evaluating the effectiveness of the quick-fire method and for conducting continuing research. (Author)

AD-A083 446/5 PC **A04/MF A01**
Center for Naval Analyses Alexandria VA Marine Corps Operations Analysis Group
Quality of Marines: Pre-Enlistment Screening Based on Predicted Performance,
Warren T. Matthews. Jun 77, 60p Rept no. CNS-1100
Contract N00014-76-C-0746

This analysis examines the mathematical relations between the performance of first-term Marines and their test scores and selected personal characteristics. The objective is to predict performance when only certain test scores and personal characteristics are known (i.e., at time of application for enlistment). A step-wise linear multiple regression process is used to identify the variables which best predict performance. Measure of performance include early attrition, desertion, early promotion, and rank achieved. A procedure for expressing the results in terms of the (new) ASVAB preenlistment test is provided, and a method for application of these results to Marine Corps enlistment screening is presented. (Author)

AD-A083 497/8 PC **A05/MF A01**
Advanced Research Resources Organization Washington DC
Trainability of Abilities: Training and Transfer of Spatial Visualization.
Technical rept. 1 Jan 79-15 Mar 80,
Jerrold M. Levine, David Schulman, Rae E. Brahlek, and Edwin A. Fleishman. Apr 80, 80p Rept nos. ARRO-3010-TR3, ARRO-R80-3
Contract N00014-77-C-0268

The feasibility of training selected abilities so as to facilitate transfer among tasks requiring these abilities and therefore reduce training time and increase personnel flexibility was investigated. Eighty undergraduate college students participated in a study of from one to five days duration. Experimental subjects received extensive practice with feedback provided on a set of tasks known to require the ability of spatial visualization. Control subjects received no practice. All subjects were tested on two transfer tasks which were dissimilar to the training tasks but which had earlier been demonstrated to require for successful task performance the abilities being trained. Results indicated that training did not significantly enhance spatial visualization as measured by a standard ability test administered before and after training. There was no evidence that performance on the transfer tasks was affected significantly as a result of training (i.e., there was no transfer of training). There was no differential retention between trained and untrained groups. (Author)

AD-A083 566/0 PC **A03/MF A01**
Arizona State Univ Tempe Coll of Education
Principles for Developing Algorithmic Instruction.
Interim rept.,
Richard F. Schmid, and Vernon S. Gerlach. 1 Dec 78, 43p TR-81201, AFOSR-TR-80-0275
Grant AFOSR-76-2900

An algorithmic procedure was examined under several instructional approaches to yield design principles pertinent to military training. Learning factors were selected from information-processing theories to test their applicability with instruction directed by learning algorithms. A version of a logical, or familiar, and a computational algorithm was generated, further divided into verbal and symbolic (mathematical) forms, and presented to sixty undergraduates. Multivariate analyses were employed on two dependent measures, instructional effectiveness and efficiency. Posttests were administered both immediately following instruction and one week later. Attention was also given to the criterion-referenced effectiveness of the various algorithmic forms. Learners achieved high scores following very brief instruction, with verbal and logical groups outperforming their comparison treatments. Retention losses after the time delay were found to closely match the typical needs of a training environment. Tentative principles for using algorithms in instructional design include emphasis on concrete, familiar content, short, compact structures, and complete mastery of each preceding operator or discriminator. The efficiency of the algorithm approach is highlighted as having unusual utility in meeting the future demands of schooling and training. (Author)

AD-A083 575/1 PC **A05/MF A01**
Perceptronics Inc Woodland Hills CA
Aircrew Emergency Decision Training: A Conference Report, 28-30 November 1978, San Francisco, California.
Interim rept.,
Luigi Lucaccini. 1 May 79, 96p PCR-1065-79-5, AFOSR-TR-80-0276
Contract F49620-78-C-0067

This report is the record of a two and one-half day working conference held in San Francisco, California, on November 28, 29, and 30, 1978. The conference brought together selected members of the military research support community, military contractors, instructor pilots, and other individuals concerned with aircrew training, safety research, and behavioral decision theory. Purposes of the conference were: (1) to review the state of the art of aircrew emergency decision training; (2) to review the implications of behavioral decision theory, safety research and training technology for aircrew emergency training; and (3) to identify current issues and recommendations for future work. Perceptronics own statement of the issues related to aircrew emergency decision training forms the initial paper in this report. The bulk of the report is made up of condensations of the individual papers and presentations from the conference.

AD-A083 599/1 PC **A05/MF A01**
Human Resources Research Organization Alexandria VA
Military Leadership in the Seventies: Selected Analyses.
Final rept.,
Michael R. Vaughan, Richard E. Kriner, and Joel M. Reaser. Jun 73, 77p Rept no. HUMRRO-FR-D2-73-2
Contract DAHC19-73-C-0047

This report contains selective analyses of the survey data resulting from the CONARC Board Survey conducted in 1971 to assess the status of leadership and leadership principles in the Army. The objectives of the research were to determine if the original battery of items could be modified and refined and to generate additional data relating to the nature of leadership in the Army. The analyses were performed using a factor analytic technique and correlational/regression methods. Findings indicated six dimensions of leadership: Professional-

ism, Authoritarianism, task-oriented Consideration, Need-oriented Consideration, Social Support, and Facilitation. The battery of items was reduced by ascertaining those items directly related to the dimensions and removal of redundant items. The basic response categories of the survey--DO, SHOULD, and IMPORTANCE--were shown to be highly interrelated, and recommendations were made for the removal of the SHOULD and IMPORTANCE categories in future research. The background variable, age, was shown to be highly related to the direction of scaled responses to questionnaire items. (Author)

DOE/IR-0056 PC **A10**/MF **A01**
Oak Ridge Associated Universities, Inc., TN.
Determinants of Coal Mine Labor Productivity Change.
J. G. Baker, and W. L. Stevenson. Nov 79, 202p
Contract EY-76-C-05-0033

Coal mine labor productivity (tons per miner-shift) has been falling yearly since 1970. The decline in labor productivity since 1970 has implications for the coal industry's labor demand, cost of production, and injuries and could hinder the ability of the industry to meet the coal output goals of the National Energy Plan. The purpose of this research study was to identify and measure the causes of labor productivity decline. Concise answers are given to three questions: Why is coal mine labor productivity important. What are the causes of labor productivity decline in deep and surface coal mines. What are the implications of these findings for future coal mine labor productivity. Coal mine labor productivity is important for three reasons: (1) it affects the cost of coal production, (2) it affects coal industry labor demand, and (3) it affects injuries and injury rates in coal mining. Labor productivity is the link between output levels and employment requirements. The period of declining productivity coincides with major changes in the coal industry's environment: (1) change from a largely unregulated industry to a highly regulated industry (the Coal Mine Health and Safety Act of 1969; implementation of many state surface mine reclamation laws, etc.) and (2) change from a declining, marginal profits industry to a growing, profitable industry (increasing coal prices and demand in the 1970s). A major conclusion of the study is that a portion of the high labor productivity of the 1960s was possible because some of the costs of coal mining - worker injuries, black lung disability, and environmental damage - were not being paid for by the coal industry and coal consumers. Once these costs were forced internally on the mine operators by legislation, productivity fell and the cost of production increased. (ERA citation 05:013007)

ED-172 830 Not available NTIS
Dynamics Research Corp., Wilmington, MA.
Digital Avionics Information System (DAIS): Training Requirements Analysis Model (TRAMOD),
Andrew J. Czuchry. Apr 79, 70p AFHRL-TR-78-58(I)
Contract F33615-75-C-5218
For related document, see IR-006 831.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The training requirements analysis model (TRAMOD) described in this report represents an important portion of the larger effort called the Digital Avionics Information System (DAIS) Life Cycle Cost (LCC) Study. TRAMOD is the second of three models that comprise an LCC impact modeling system for use in the early stages of system development. As part of the overall modeling system, the training model is an efficient tool for developing training programs on the basis of task, time, and resources criteria. This report explains the approach used in developing this model and its analytic value as a method for determining training requirements, as well as the methodology used to develop the task-related characteristic data necessary for its application to the DAIS. The model is described by explaining the techniques and algorithms used to accomplish its function, and the task dictionary, task characteristic parameters/values, and acronyms are provided in appendices. A bibliography is included.

ED-174 254 Not available NTIS
Tennessee Library Association, Nashville. Education Committee.
The Expected Role of Beginning Librarians: A Comparative Analysis from Administrators, Educators, and Young Professionals. Proceedings of a Conference,
R. Wilburn Clouse. Mar 79, 68p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Director's Office, MSU Libraries, Memphis State University, Memphis, TN. 38152 (J.W. Brister Library Monograph Series no. 9, $5.00).

The papers included in this volume constitute the proceedings of a conference on the theme of the expected role of the professional librarian in an academic library, a public library, a school library, and a special library. Grouped under these four different library headings, the papers present the viewpoints of library administrators, library science educators, and young practicing professionals, and provide a comparative analysis of the expected roles. The appendix lists the conference attendees.

ED-174 262 Not available NTIS
Library Skills for Primary Grades,
Jane Bandy Smith. 1977, 46p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

A field-tested instructional program that successfully taught library location and retrieval skills to second and third graders is described in this report; materials and teaching strategies used in the program are included. The main instructional materials are student worksheets that have a dinosaur theme and numerous primary-type drawings. Activities such as dot-to-dot, matching, and drawing are used to teach the following objectives: (1) procedure for book check-out; (2) recognition that the Dewey Decimal symbols designate nonfiction books; (3) recognition that letter combinations designate fiction books; (4) recognition that subject cards hava a capitalized top line; (5) location of the call number on a catalog card; (6) location of the corresponding call number on a book; and (7) recognition that subjects are arranged in sections in a library. Evaluation of this teaching program was a hands-on activity with students working in pairs to identify a book through a subject catalog card and to locate it on the shelf. Scheduling of this program is adaptable to varying time frames: daily, weekly, or bi-weekly.

ED-174 263 Not available NTIS
The Linking Agent and FLS: Research Supported Assumptions about Linkage,
Charlotte Springfield, and E. Chris Anderson. Apr 89, 16p
Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA. April 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This paper describes the Florida Linkage System (FLS), which was designed to help schools throughout the state improve their problem-solving processes and knowledge utilization. While the system's goals are listed and a model for its linkage strategy is outlined, the major portion of the report discusses three findings about the linkage strategy and implications for the linking agent's role in each: (1) money and information networks are important but not sufficient to effect changes in educational practice; (2) continuously available help from a process agent, i.e., a linker, sustains school-based commitment; (3) training which enhances the professional climate of schools by improving the process skills of teachers and administrators (e.g., communication, leadership, planning, and decision making), as well as their problem identification and solution selection skills, is effective.

HRP-0900626/3 PC **A07**/MF **A01**
Sonoma State Univ., Rohnert Park, CA. Dept. of Nursing.
Evaluating Nursing Education: A Research Manual,
Katherine L. Jako, Sally Brian, Edward F. Church, and Mary W. Searight. c1979, 129p
Grant PHS-NU-29044

A research design for the evaluation of nursing education, known as the National Second Step Project (NSSP), is detailed. Launched with Federal funds in 1978 by a research group affiliated with the Sonoma State University in California, NSSP is influenced by social factors in its modeling of baccalaureate nursing education. In addition to offering a curriculum reflecting various aspects of holism, NSSP programs are often designed with nontraditional students in mind. Curriculums frequently incorporate self-directed contractual study, course content emphasizing self-actualization and leadership, part-time study, and evening and summer classes. The design of a multicampus evaluation research approach is considered in terms of the survey population and sample, objectives, setting a timetable, and adopting a methodological approach. The evaluation methodology is detailed with regard to sources of information and data collection tools and techniques (standardized tests, project-designed instruments, and observations and document review). Evaluation procedures are outlined as they pertain to data collection, data processing, providing feedback to participants, and communication and decisionmaking. Particular attention is given to qualitative and quantitative data analysis, data validity and reliability, and data synthesis and interpretation. Planning, writing, editing, and disseminating the final evaluation report are discussed. Sample survey forms and references are included.

HRP-0901719/5 PC **A10**/MF **A01**
American Association of Colleges of Osteopathic Medicine, Washington, DC.
Faculty Assessment Project for Colleges of Osteopathic Medicine. Volume III. Resource Materials.
Final rept. 26 Sep 77-25 Oct 78.
1978, 225p
Contract PHS-HRA-231-77-0066
See also Volume 1, HRP-0901726, and Volume 2, HRP-0901727.

The sourcebook of faculty development resources and guidance materials was developed as part of a study of faculty development needs in colleges of osteopathic medicine. The selected bibliography on faculty development for colleges of osteopathic medicine includes a general annotated bibliography on faculty development, a general unannotated bibliography on faculty development, and an annotated and an unannotated bibliography on faculty development in medical education. Faculty development consultants are listed with experience and expertise in various specialty areas including curriculum, evaluation and testing, faculty development, instructional design, instructional technology, medical education, organizational development, simulation, teaching methods, and workshops. An assessment of private and Federal sources of funds for conducting faculty development programs includes information on foundation grants awarded for faculty development or medical education for the period 1974 through 1977; profiles of major foundations of national scope; a listing of foundations of local or restricted scope funding medical education, organized by state; guidance on applying for foundation support for faculty development programs; a bibliography of foundation grant application guides; and a guide to the process of obtaining Federal support for faculty development programs.

HRP-0901726/0 PC **A02**/MF **A01**
American Association of Colleges of Osteopathic Medicine, Washington, DC.
Faculty Assessment Project for Colleges of Osteopathic Medicine. Volume I. Executive Summary.
Final rept. 26 Sep 77-25 Oct 78.
1978, 13p
Contract PHS-HRA-231-77-0066
See also Volume 2, HRP-0901727, and Volume 3, HRP-0901719.

The results of a study of faculty development needs in colleges of osteopathic medicine are summarized. The purpose of the study was to review current faculty development needs in schools of osteopathic medicine, to gauge the formal organizational and programmatic factors which influence the success of faculty development in medical settings, and to provide plans for, and assistance in, the implementation of faculty

development assessment programs in schools of osteopathic medicine. Faculty members' training for the teaching role was investigated. Current educational practices employed by the faculty, including the use of various types of resources, were studied. Faculty perceptions of current issues in medical education and interest in instructional skills development programs were considered. In addition, the literature on faculty development models, programs, and program evaluation in medical education was reviewed, and five model faculty development projects at medical colleges were evaluated in terms of their applicability to osteopathic medical education. The methodology used in the study is reviewed briefly and major findings are listed. Study conclusions and recommendations are summarized.

HRP-0901727/8 PC **A07/MF A01**
American Association of Colleges of Osteopathic Medicine, Washington, DC.
Faculty Assessment Project for Colleges of Osteopathic Medicine. Volume II. The Comprehensive Report.
Final rept. 26 Sep 77-25 Oct 78.
1978, 147p
Contract PHS-HRA-231-77-0066
See also Volume 1, HRP-0901726, and Volume 3, HRP-0901719.

The results of a study of faculty development needs in colleges of osteopathic medicine are reported. The purpose of the study was to review current faculty development needs in the schools, to gauge the formal organizational and programmatic factors which influence the success of faculty development programs in medical settings, and to provide plans for, and assistance in, the implementation of faculty development assessment programs in schools of osteopathic medicine. A needs assessment evaluation was undertaken to determine faculty members' training in instruction for primary care practice , assess the perceptions of faculty members on current issues in osteopathic education, and ascertain the structural and organizational differences among the various schools of osteopathic medicine which would influence the estblishment of faculty development programs. Interest by faculty in development programs was also investigated. Existing literature on faculty development models, processes, and program evaluations used in medical education settings was reviewed. Five model faculty development projects at medical colleges were evaluated in terms of their applicability to osteopathic medical education. Sources of funding for conducting faculty development projects were also investigated.

HRP-0901823/5 PC **A02/MF A01**
Pittsburgh Univ., PA. School of Dentistry.
Short-Term Training for Vietnamese Refugee Dentists - Pittsburgh.
Final rept.
1978, 22p
Contract PHS-HRA-231-77-0051

A project was initiated by the University of Pittsburgh's School of Dental Medicine in Pennsylvania to provide training for Vietnamese refugee dentists. The project goal was to promote students from predetermined clinical, academic, and linguistic levels to the highest proficiency level possible over a 6-month period. Nineteen Vietnamese refugee dentists were included in the training project which emphasized cultural orientation, language training, and preparation for State and national licensure examinations. Of the group of dentists that arrived in 1977, one had passed national boards (both parts) and four had passed part one. The remaining dentists had not taken any board examinations. After training was provided over a 3-month period and the proficiency of dentists was tested, adjustments were made in trainee schedules. At the end of the 6-month training period, five persons were ready for part one of the national board examination but needed further training for part two. Four trainees were allowed to complete bench training in operative procedures and prosthodontics. Trainees in the clinical phase were ready to take the clinical examination for licensure. Participants in the project indicated that training was highly beneficial. Supporting tables are appended.

HRP-0901824/3 PC **A02/MF A01**
Texas Univ. Health Science Center at Houston.
Short-Term Training for Vietnamese Refugee Dentists - Houston.
Final rept.
1978, 12p
Contract PHS-HRA-231-77-0044
See also HRP-0900034.

Training was provided by the University of Texas Dental Branch at Houston for a group of 17 Indochinese dentists. The purpose of the training program was to enable Indochinese refugee dentists to pass national boards in dentistry and make it possible for them to apply for licensure in their State of residence. Four specific objectives of training were: (1) to identify estimated needs in preparing Indochinese dentists for national boards; (2) to provide cultural orientation; (3) to provide short-term clinical skills training for qualified candicates to take State board examinations; and (4) to provide each training candidate with an objective assessment of skills and competencies to aid in making realistic career decisions. Coursework was offered over a 25-week period; didactic studies focused on anatomy, biochemistry, cardiopulmonary resuscitation, English, histology, microbiology, oral anatomy, pathology, and physiology. After the completion of training, 14 passed part one of the national boards, 4 passed part two, and 1 passed part two conditionally.

HRP-0902002/5 PC **A99/MF A01**
Educational Testing Service, Princeton, NJ.
A Course on Agency Management. Leader's Guide.
1979, 611p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational System.

The purpose of this course on health systems agency (HSA) management is to assist executive directors and their supervisors in becoming better managers. Seven course goals are to provide a different perspective on and an appreciation of the nature of management, to understand how characteristics of organizations apply to the HSA environment, to appreciate and understand management planning, to acquaint HSA personnel with general principles and specific techniques relevant to annual work program and budget development, to improve the utilization of financial data in the agency management process (financial reporting and analysis and decisionmaking), to improve skills in getting HSA's work done through people, and to enhance evaluation and emphasize the role of evaluation in agency credibility and accountability. A series of intensive programs, based on the use of multimedia presentations, deals with the nature of management, characteristics of organizations, planning the work of an HSA, getting the work done, and evaluation. For each program, the following types of information are given: one-page summary; goals and objectives; teaching methods; needed materials and equipment; faculty requirements and suggestions for teaching; evaluation strategy; time allocation; and evaluation information from a pilot program presentation. Case studies are included.

HRP-0902004/1 PC **A02/MF A01**
Educational Testing Service, Princeton, NJ.
Recruiting and Selecting the Professional Staff for a Health Systems Agency.
1979, 22p
Contract PHS-HRA-230-75-0064
Report on Health Resurces Planning Educational System - A Self-Instruction Unit.

A self-instructional unit is presented to facilitate the recruitment and selection of health systems agency staff members. It is envisioned that users of the unit will be able to accomplish seven objectives upon completion of the unit: (1) develop selection procedures in accordance with performance standards set by DHEW and fair employment laws and regulations; (2) prepare job specifications; (3) organize recruiting programs; (4) obtain appropriate background information on candidates; (5) conduct interviews with candidates; (6) develop methods for assembling and evaluating applicant data for decisionmakers; and (7) orient personnel to job, staff, and community. Questions and exercises are geared to principles and steps involved in the recruitment and selection of professional staff members. A sample job position profile noting duties and responsibilities and qualifications (knowledge areas, skills, abilities, and personal characteristics) is provided.

HRP-0902006/6 PC **A04/MF A01**
Educational Testing Service, Princeton, NJ.
Resource Development and Implementation. Roles and Responsibilities.
1979, 58p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational System - A Self-Instruction Unit.

The self-instructional unit deals with health systems agency (HSA) staff and committee functions relative to resource development and implementation. Part of the Health Resources Planning Educational System, the unit is designed for use in the training of HSA staff members and volunteers. Unit performance objectives are to prepare a standing committee mission statement for carrying out resource development and implementation functions and to prepare a position description for lead staff members on committees. The unit's content assumes general familiarity with the National Health Planning and Resources Development Act (P.L. 93-641), performance standards, and HSA organizational structure. The suggested sequence of study activities covers creative action for implementation, a taped interview with an HSA associate director, HSA authority structure and implementation, P.L. 93-641, performance standards, committee mission statement, and position description.

HRP-0902011/6 PC **A05/MF A01**
Educational Testing Service, Princeton, NJ.
Financial Management.
1979, 81p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational System - A Self-Instruction Unit.

The topic of this self-instructional unit is health systems agency (HSA) financial management. The intended audience includes HSA executive directors and senior professional staff members engaged in planning, budgeting, reporting, analyzing, and decisionmaking. Appropriate financial data utilization for both internal and external management purposes is the overall goal of the unit. It is anticipated that users who complete the unit will be able to: develop, prepare, and present line and program budgets-financial reports; suggest alternative uses of resources when financial problems are encountered; identify financial issues for discussion with HSA board and staff members; and understand and utilize fiscal monitoring and control techniques. Instructions on how to complete the unit are taped, and exercises are included in the written manual.

HRP-0902012/4 PC **A03/MF A01**
Educational Testing Service, Princeton, NJ.
Evaluating Peformance. A Self-Instruction Unit.
1979, 49p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational System.

This self-instructional unit is designed to facilitate the appraisal of subordinate performance by health systems agency (HSA) executive directors and supervisors. Unit objectives are to determine what performance evaluation is and what it should accomplish, to identify problems in appraising performance, to understand different types of appraisal methods and their strengths and weaknesses, and to use appraisals in performance improvement. Performance evaluation is an essential aspect of managerial functions, and the effectiveness of an evaluation or appraisal program depends on the amount of training and instruction given to raters. Raters should be aware of organizational goals, common difficulties faced in evaluation, and weaknesses associated with the rating process. They should understand various rating procedures and know how to interpret and use results in performance improvement. Information to assist HSA executive directors and supervisors is presented in paragraph form, followed by questions to focus attention on salient points.

HRP-0902051/2 PC **A02/MF A01**
Educational Testing Service, Princeton, NJ.

Health Resources Planning Educational System. Executive Summary,
Arleen S. Barron, and Charles E. Scholl. Jun 78, 23p
Contract PHS-HRA-230-75-0064

Procedures followed in a project to develop an educational system that encompasses basic functional needs and advanced-level professional development related to health resources and health planning are described. The project was initiated to improve the effectiveness of continuing education for health resource planners, to conduct training sessions, to develop recommendations for a model or plan of continuing education and training programs, and to develop and test self-instructional units for health planners in specific content areas based on needs. Health planning agencies participating in functional task analysis included nine (b) agencies, three (a) agencies, two experimental health service delivery systems, and three regional medical programs. Questionnaires were mailed to agency/program officials, and site visits were made. Cluster analysis of findings resulted in seven task areas: agency direction (health planning and promotion), agency direction (administration and coordination), community involvement in health planning and promotion, information systems and data analysis, special studies for health planning, review process, and allocation of developmental funds. Competency areas related to knowledge, skills, and abilities emerged as being essential to the performance of one or more task areas. Competencies selected for inclusion in the Health Resources Planning Educational System were agency management, resource development and implementation, systems approach to health plan development, community involvement and public information, and evaluation as a tool for health systems agency executive directors. A topic by course program/unit matrix is included.

HRP-0902095/9 PC **A03**/MF **A01**
Pennsylvania Univ., Philadelphia. Emergency Medical Services.
Sources of Funding. Instructor's Manual,
C. Gene Cayten. 1979, 44p
Sponsored in part by Bureau of Health Professions, Hyattsville, MD. Div. of Medicine.

There has been in the recent past and will continue to be in the foreseeable future considerable federal and foundation support for developing emergency medical services systems. It is essential for administrators to know what funding sources are available, for what aspect of system development, and also how to tap these sources. Outside funding sources will not last forever and it is necessary to plan for eventual self-sufficiency. To do this administrators must understand what local monies are available and prepare to capture them for the long-term maintenance of the system. There are two solutions: one is that the user pays for services; the other is that local government assumes responsibility for emergency care financing. There is, of course, the combination of both methods. In this session, all sources of EMS funding are reviewed, as are the issues involved in determining on-going system support.

HRP-0902104/9 PC **A04**/MF **A01**
National Environmental Health Association, Denver, CO.
Self Assessment Tools for Environmental Health Practitioners.
Final rept. 29 Sep 78-31 Dec 79.
4 Jan 80, 65p
Contract PHS-HRA-232-78-0139

In order to establish a national professional competency system, it is necessary to analyze the profession; research current activities and practitioner capabilities; and provide guidance on opportunities for professionals to upgrade their technical abilities. This process is neither easy nor inexpensive. However, if practitioner competency is truly desired, then such a process must be considered and initiated. Competency-based means developing the education or training program around the knowledge and skill competencies needed to perform in a field. It begins by defining the performances required, defining the knowledge and skill competencies needed for the performance, and defining learning objective appropriate for the competencies. The process may conclude by appraising the student based on the articulated competencies and learning objectives. The Knowledge, Skill, and Attribute Blueprint is based on the Role Delineation Instrument, and is therefore, competency-based. This Blueprint has potential for widespread use in developing academic programs, training programs, and continuing education programs. It has served a more immediate need, however, as the blueprint for a new environmental health proficiency examination and for self-assessment tools. It is the development of the self-assessment tools that this report is about.

HRP-0902147/8 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia. Emergency Medical Services.
Public Information/Education: Student Manual,
C. Gene Cayten. 1979, 22p
Contract PHS-HRA-231-75-0601

Public education is the least developed component of most Emergency Medical Services systems for many reasons. First, administrators' initial concerns have been with putting the system in place and they have postponed publicity until the system could handle increased utilization. Second, the general public is unaware of what it doesn't know or needs to know, is unorganized and consequently silent. Finally, mechanisms for public education/information are not sophisticated and past campaigns have achieved only qualified success. The aim of this unit is to present the information needs of the public for whom the EMS system is constructed. This includes what the public needs to know and what the system wants the public to know so that its services are properly utilized. The instructor will discuss the informational/educational activities implied by both these needs. The class will plan a public information campaign and review some past activities and informational materials.

HRP-0902148/6 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia. Emergency Medical Services.
Public Information/Education. Instructor's Manual,
C. Gene Cayten. 1979, 25p
Sponsored in part by Bureau of Health Professions, Hyattsville, Md. Div. of Medicine.

The material prepared for this module and others found in the curriculum is intended primarily for incumbent Emergency Medical Services administrators who oversee the coordination of an emergency medical services system or who oversee some aspect of systems operation. The module that follows is provided to increase the knowledge and skills of incumbent EMS administrators with its focus on one particular aspect of EMS systems. The outline, exercises, bibliographies, and appendices are intended as a guide which offers methods for demonstrating the topics relevant to the module.

HRP-0902150/2 PC **A03**/MF **A01**
Pennsylvania Univ., Philadelphia. Emergency Medical Services.
Mobilizing Public Support and Participation. Instructor's Manual,
C. Gene Cayten. 1979, 49p
Sponsored in part by Bureau of Health Professions, Hyattsville, MD. Div. of Medicine.

The development of an Emergency Medical Services system depends upon many individuals whose primary concern is not the EMS system. This group includes legislators, government officials, public safety agency officials, telephone company officials, school officials, media people, hospital administrators, as well as the providers, the physicians, nurses and paraprofessionals. They must be motivated to work cooperatively and productively in a venture that threatens their independence or, at a minimum, forces them to take a stand. If they are not mobilized, if their power is not used in behalf of the developing system, no system can be developed. The general public needs to be mobilized as well as the power people and, in fact, an enthusiastic public becomes an important tool in motivating power people. This session identifies which people are key for which system needs and analyzes various means of involving them to aid in system development.

ORAU-155 PC **A04**/MF **A01**
Oak Ridge Associated Universities, Inc., TN. Manpower Development Div.
Coal Mine Labor Productivity: Review of Issues and Evidence.
J. G. Baker, and R. J. Gaston. May 79, 52p
Contract EY-76-C-05-0033

Productivity in bituminous coal and lignite mining has declined substantially during the 1970s. This decline has implications on coal industry labor demand, production cost, and worker health and safety. This report reviews existing research that has attempted to explain the productivity decline. The research results reported here indicate that deep mine productivity has been reduced by the Coal Mine Health and Safety Act of 1969, work stoppages, and the 1974 National Bituminous Coal Wage Agreement. In addition, there is strong evidence that manpower shortages have affected productivity. Surface mine productivity has declined because of a reduction in average mine size and state reclamation laws. Future research directions are discussed. (ERA citation 05:013011)

PAEC(C)VD-78002 PC **A03**/MF **A01**
Philippine Atomic Energy Commission, Manila.
Education and Training Requirements of Nuclear Power Plant Personnel. A Bibliography 1955-1976 (NSA).
R. Donato, C. A. Perlas, and E. Conti. 1978, 45p
U.S. Sales Only.

This bibliography was compiled by the Scientific Library staff to help in the intensified training program being undertaken by the Philippine Atomic Energy Commission (PAEC) for the nuclear power plant personnel of the Philippines' first nuclear power reactor. This bibliography covers the period 1955 - 1976 of the Nuclear Science Abstracts and is composed of 281 entries. Arrangement of these entries is by broad subject category. (Atomindex citation 10:463844)

PB80-168446 PC **E05**/MF **E05**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Migration and Settlement: Measurement and Analysis.
Final rept.,
Andrei Rogers, and Frans Willekens. cAug 78, 123p RR-78-13

The report brings together four articles that describe major results of IIASA's research on the measurement and analysis of migration and population redistribution patterns. It complements a collection of seven papers published recently as a special issue of the journal Environment and Planning, A (May, 1978). The proceedings of the 1978 September Conference on the Comparative Study and the forthcoming report on computer programs will conclude the Task's series of final reports.

PB80-170640 PC **E12**/MF **$6.25**
Industrial Relations Research Association, Madison, WI.
Collective Bargaining: Contemporary American Experience.
Final rept.,
Gerald G. Somers. Mar 79, 978p LMSA/DRA-80/01
Contract DL-J-9-P-6-0074
Prepared in cooperation with Wisconsin Univ.-Madison.

The study provides a detailed description and analysis of contemporary collective bargaining in major industries: agriculture, airlines, coal, construction, education, electrical products, hospitals, postal service, steel and trucking. Written by ten different authors, the studies summarize and interpret current trends, practices and results of collective bargaining, and their implications for public policy.

PB80-173800 PC **A06**/MF **A01**
Office of Education, Washington, DC.
Selected Bibliography of Egyptian Educational Materials. Volume 4, Number 3, 1978.
1980, 116p TT-78-59141/3
See also Volume 4, Number 2, PB80-113988. The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

A bibliography of educational materials in Egypt cites publications dealing with various phases of academic and technical training. Abstracts are presented of books and articles on organization, facilities, students, and teaching methods. Other topics are administration, testing, illiteracy, textbooks, social aspects, objectives, and higher education.

PB80-173917 PC **A13**/MF **A01**
Washington Univ., Seattle. Graduate School of Business Administration.
An Empirical Test of a Behaviorally Oriented Negotiations Model in the Public Schools in the State of Washington.
Final rept.,
Alan Mark Cabelly. 1980, 300p DLETA-91-53-79-01-1
Contract DL-91-53-79-01
Doctoral thesis.

The study presented herein provides a major public sector test of the Walton and McKersie behavioral model of collective bargaining. This model divides collective bargaining into four chief components: distributive, or win-lose bargaining; integrative bargaining, or problem-solving; attitudinal structuring, attempting to control the attitudes of the opposite party; and intraorganizational bargaining, or team consensus formation. Hypotheses, stating specific relationships between conditions or behaviors of bargaining and the types of bargaining, have been derived and tested.

PB80-174071 PC **A99**/MF **A01**
Educational Testing Service, Princeton, NJ.
The PLATO Elementary Demonstration Educational Outcome Evaluation. Final Report,
Spencer S. Swinton, Marianne Amarel, and Judith A. Morgan. Nov 79, 724p PR-78-11-REV
See also PB80-174089. Revision of report dated Nov 78.

The report is the summary of a longer report of the results of a five-year evaluation of the Elementary Education Demonstration of the PLATO computer-based instructional system. The full evaluation final report and a volume of appendices, including means, instruments and preliminary analyses, are available under separate cover.

PB80-174089 PC **A03**/MF **A01**
Educational Testing Service, Princeton, NJ.
The PLATO Elementary Demonstration Educational Outcome Evaluation. Final Report: Summary and Conclusions,
Spencer S. Swinton, Marianne Amarel, and Judith A. Morgan. Nov 78, 31p PR-78-11
Grant NSF-SED76-06734
See also PB80-174071.

The Computer-based Education Research Laboratory placed about 100 PLATO computer terminals and ancillary devices in Illinois elementary classrooms. Two groups of curriculum developers prepared supplemental lessons in beginning reading for over 700 children in K-2 and in mathematics for over 300 children in 4-6. This external evaluator's report describes the project's development, implementation, and measured educational outcomes.

PB80-175615 PC **A03**/MF **A01**
Minimum Wage Study Commission, Washington, DC.
Transcript of Minimum Wage Study Commission Meeting, Held at Washington, DC on April 8, 1980.
1980, 39p

The report is a transcript of a meeting held on April 8, 1980 by the Minimum Wage Study Commission. Among the topics discussed are the demographics update and the inflation update.

PB80-175680 PC **A09**/MF **A01**
Westat, Inc., Rockville, MD. Research Div.
Continuous Longitudinal Manpower Survey. Report No. 10. Characteristics of Enrollees Who Entered Adult-Oriented Comprehensive Employment and Training Act (CETA) Programs During Fiscal Year 1978, October 1977 Through September 1978.
Final rept.
Jan 80, 197p MEL-79-24
Contract DL-23-24-75-07
See also report no. 8, dated Mar 79, PB-300 973.

The report is the tenth from the Continuous Longitudinal Manpower Survey (CLMS) of a national sample of participants in decentralized programs under the Comprehensive Employment and Training Act (CETA). It is on the characteristics of enrollees who entered adult-oriented CETA programs during Fiscal Year 1978.

PB80-183718 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
A Report on the Massachusetts Institute of Technology Sea Grant College Program, 1 July 1978 to 30 June 1979.
Annual rept. Jul 78-Jun 79.
Dec 79, 52p MITSG-80-2, NOAA-80040709
See also PB-294 582.

During this past year, MIT celebrated its ninth anniversary as part of Sea Grant, a national program established by Congress to aid the United States in developing its marine and coastal resources. Summaries are given of the programs in the following areas: research on the coastal zone - marine pollution, food from the seas, offshore resource, development, technology for ocean uses, the Doherty Professorships; advisory services on transferring technology to the public and Research Vessel Edgerton; and education - developing human resources. In addition a summary of expenditures by activity is presented and student participants, publications, matching fund supporters, MIT/Marine Industry Collegium membership, and the administration and staff are listed.

PB80-184559 PC **A05**/MF **A01**
Columbia Univ., New York. Bureau of Applied Social Research.
Employment of Women and Fertility.
Final rept.,
A. J. Jaffe, and Jeanne Clare Ridley. Sep 76, 100p NICHD/CPR/SBSB-79-12
Grant PHS-HD-06130-02
Prepared in cooperation with Georgetown Univ., Washington, DC. Kennedy Inst.

The report is a study on the interrelationships among education, women's participation in the labor force, and fertility. It includes sections on length of working life - historical notes; fertility; fertility and lifetime employment; educational attainment, labor force participation and fertility; an historical note on paid labor force participation; occupational differentiation by sex in the United States, 1900 to 1970; and concluding observations.

PB80-927906 PC **E02**
Central Intelligence Agency, Washington, DC.
Government Structure of the Democratic People's Republic of Korea; a Reference Aid.
Wall chart.
Mar 80, 11p CR-80-10353
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-927900.

The wall chart details the organizational structure of the government of the Democratic People's Republic of Korea and identifies the personalities who compose that government.

PB80-928109 PC **E05**/MF **A01**
Central Intelligence Agency, Washington, DC.
Directory of USSR Ministry of Defense and Armed Forces Officials; a Reference Aid.
Apr 80, 95p CR-80-11688
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928100.

The Directory is a functional reference guide to leading officials of the Soviet Ministry of Defense and of the Armed Forces.

PB80-928208 PC **E13**/MF **A01**
Central Intelligence Agency, Washington, DC.
Appearances of Leading Chinese Officials during 1979; a Reference Aid.
Mar 80, 443p CR-80-10415
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-926200.

The publication is a chronological listing of the public appearances of a selected group of Chinese officials during 1979.

SHR-0003132 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Inst. for Research on Poverty.
Selective Employment Subsidies: Can Okun's Law Be Repealed.
John Bishop, and Robert Haveman. Sep 78, 25p
Grant DL-51-55-73-04
Presented at the American Economic Association Meetings, Chicago, Ill., August 29, 1978.

The 3.2 percent change in the gross national product (GNP) per percentage point change in the unemployment rate (implicit in Okun's Law) has been revised downward to the 2.1 - 3.1 range (Clark, 1977; Perry, 1977). These indications of structural changes in labor markets reinforce statistics on excessively high unemployment rates for youths and blacks, and on labor force participation rates that are increasing for women and decreasing for men. In both the United States and Western Europe, extensive selective employment subsidy policies (SESP's) have been enacted to combat the recent unemployment problem and offset increased structural labor market rigidities caused in part by government policies such as the minimum wage. SESP and changes in potential GNP and Okun's Law are not unrelated phenomena. This paper explores that relationship. A brief taxonomy of the primary SESP's which have recently been enacted in western industrialized countries and which are currently under consideration in the United States is presented, and the economic rationale underlying these measures is discussed. The relationship of SESP to the prospective growth of aggregate output in the context of Okun's Law is explored. If these measures are successful in achieving their objective, the repeal of Okun's Law is implied; however, the success of these measures requires that changes in employment decisions be made in response to SESP. Evidence on the existence and magnitude of these changes in the case of the New Jobs Tax Credit, an SESP which has been in operation in the United States, is presented. A time - series analysis of the New Jobs Tax Credit suggests that total employment in construction increased by 150,000 - 670,000 jobs from mid - 1977 to mid - 1978 because of the subsidy. This was about 25 percent of the observed employment increase in these industries. Similar analysis indicates that the program led to a reduction in upward price pressure in these industries, reducing consumer costs by $1.9 - 3.6 billion. Tabular data and references are provided.

SHR-0003420 PC **A02**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC. Center for Educational Research and Evaluation.
National Evaluation of the ESEA Title I Migrant Program. A Brief Description.
Ben Cameron. Nov 77, 23p

The national evaluation of the Elementary and Secondary Education Act (ESEA) Title I Migrant Program whose design is described in this report is intended to meet the mandate of the statute which directs the Commissioner of Education to provide for independent evaluations which describe and measure the impact of programs and projects initiated under the Act. Specifically, this study has the following purposes: (1) to assess the impact of the program on the basic skill attainment and school attendance of participants in the second, fourth, and sixth grades; (2) to validate the migrant student counts used in the allocation of funds to the States; and (3) to describe the services and recipients of the program, including the English language facility of participants, the level of achievement in basic skills of participants in the second, fourth, and sixth grades, and the attitudes toward self and school of those in the fourth and sixth

grades. This paper describes the components of the study, the methods of collecting the information needed, and the use that will be made of the data gathered. To meet the 3 objectives of the study, information will be collected and organized for 3 corresponding studies -- the impact study, the validation study, and the descriptive study. To meet the first objective of the study, assessing the impact of the program on basic skills attainment and the persistence in school of participants in the second, fourth, and sixth grades, a national probability sample of 6,000 students (2,000 per grade) will be drawn. The methodology and instruments to be used are described. The validation study is designed to produce estimates of full - time equivalent residence of migrant students (by region) and of similar figures calculated from enrollment in all schools attended. The descriptive study will look at the program from 2 related perspectives -- what projects offer to migrant children and what 'typical' migrant students received over a year's period.y,omponents of each of these 3 studies are discussed.

5J. Psychology (Individual and Group Behavior)

AD-A083 048/9 PC A03/MF A01
Illinois Univ At Urbana-Champaign Dept of Psychology
Analyzing Infrequent Events: Once You Find Them Your Troubles Begin.
Technical rept.,
Charles L. Hulin, and Denise M. Rousseau. Apr 80, 33p Rept no. TR-80-3
Contract N00014-75-C-0904

A theoretical/methodological analysis of the study of infrequent or low base rate events and behaviors is presented. Problems of interpretation caused by aggregation across arbitrary time limits imposed by the necessity to obtain variance in dependent measures, aggregation across heterogeneous samples drawn from unspecified populations, studies of rates of occurrences per group, studies of surrogates with less extreme base rates, and studies of post hoc groups defines after the occurrences of the event are all discussed. The problems with each attempt to circumvent extremes of base rates were considered. Available alternatives were presented and discussed. (Author)

AD-A083 185/9 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Tactile Roughness of Grooved Surfaces: a Model and the Effect of Friction,
M. M. Taylor, and S. J. Lederman. 6 Mar 74, 14p Rept no. DCIEM-73-RP-981
Availability: Pub. in Perception and Psychophysics, v17 n1 p23-36 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 441/6 PC A02/MF A01
Human Resources Research Organization Alexandria VA
The Effect of Different Levels of Confinement on the Self-Concept of Military Stockade Inmates.
Consulting rept.,
Louis J. Beccaria. May 71, 25p
Contract DAHC19-70-C-0012

The primary purpose of this report is to examine the effects of different levels of confinement on inmates' self-concepts in order to determine whether these levels of confinement act as agents or deterrents in the rehabilitation process. The effects of medium security confinement, characterized by multi-person cells, long periods of idleness, and restricted use of recreational facilities, are compared with effects of minimum security arrangements, in which living conditions are better and activities are less restricted. Background data on the subjects' personal history are also investigated. (Author)

AD-A083 443/2 PC A02/MF A01
Office of Naval Research London (England)
International Conference (15th) on Applied Military Psychology, 7-11 May 79.
Conference rept.,
M. J. Farr. 31 Dec 79, 19p Rept no. ONRL-C-12-79

The Fifteenth International Symposium on Applied Military Psychology was held in Jerusalem, Israel, 7-11 May 1979 with the Israeli Defence as hosts. The theme of the conference was 'Psychological Aspects of Recruitment and Adjustment to Military Life'. Twenty-seven representatives of 12 countries were present. This conference report reviews the formal presentations that were the substance of the symposium. (Author)

AD-A083 569/4 PC A04/MF A01
Yale Univ New Haven CT School of Organization and Management
Introduction to Group Relations and Organizational Diagnosis.
Technical rept.,
Clayton P. Alderfer, L. Dave Brown, Robert E. Kaplan, and Ken K. Smith. Apr 80, 57p Rept no. CPA 80-3
Contract N00014-79-C-0626

The perspective of Group Relations and Organizational Diagnosis did not emerge from a vacuum. It is rooted in a clinical perspective on the study of organizations. There are signs of the methodology in the earliest and most formative substantive studies in the field of organizational behavior. Evidence suggesting an intergroup theoretical perspective can be found in the three earliest action research projects, although none of them demonstrate more than tacit understanding of intergroup dynamics and their use for understanding of intergroup dynamics and their use for understanding and changing organizational behavior. As time passed and the clinical study of organizational behavior became more differentiated, the function of organizational diagnosis became a specialty in its own right. Earlier treatments of organizational diagnosis, like the initial studies of organizational behavior, did not explicitly conceptualize their work in intergroup terms, but observable limitations or self-acknowledged problems by the authors again pointed to the potential advances suggested by an intergroup perspective. The earlier works also varied in the degree to which they contributed to the entry, data collection, or feedback phases of organizational diagnosis.

ED-174 225 Not available NTIS
Qualitative Methods and a Phenomenological Perspective in Library Research,
Joseph P. Natoli. 1976, 13p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

A phenomenological approach to library research utilizing qualitative research methods is contrasted to a positivist-behaviorist approach utilizing quantitative methods. Psychological understanding of a situation attained by means of accurate description, and subjectivity and associated intentionality are presented as part of the phenomenological perspective. Criticism of various aspects of theory and hypothesis formulation, sampling, approach. The argument here is for the use of an appropriate research orientation in regard to those aspects of librarianship which cannot be treated justly according to the positivist-behaviorist model.

PB80-171309 PC A03/MF A01
Salt Inst., Alexandria, VA.
Testing the Effects of Applied Behavioral Analysis and Applied Behavioral Management Techniques on the Safe Behaviors of Salt Mine Personnel.
Open file rept. (Final), 1 Jul 76-30 Sep 78,
S. Stephen Uslan, Harvey M. Adelman, and Robert S. Keller. 30 Sep 78, 44p BUMINES-OFR-44-80
Contract J0166137
Prepared in cooperation with Human Potential Development Corp., Canoga Park, CA.

The purpose of the study was to demonstrate the effect of positive reinforcement, specifically, social reinforcement (SR) on the frequency of eye, hand, and back injuries at four experimental salt mines. Injury data were collected from January 1976 through September 1978 on a month-by-month basis. Approximately 100 managers and supervisors were trained in the use of positive reinforcement of occurrences of 'safe behavior'. Each was provided with manuals and other supportive materials and following training, they were provided coaching experience to help retain the knowledge and capabilities gained.

PB80-173610 PC A12/MF A01
California Univ., Berkeley. Inst. of Business and Economic Research.
The Influence of Variable Work Schedules on Worker Responses to Their Jobs.
Final rept.,
Karlene H. Roberts. Mar 80, 275p DLMA-21-06-78-17-1
Grant DL-21-06-78-17

The grant supported work for one year on an ongoing project that compared responses to jobs by workers who work different numbers of hours per week. A sample of 1,621 full and part time United States based workers and 189 full and part time Puerto Rican workers responded to demographic and family life circumstance questions and to questions about the focal job concerning work values, organizational commitment, role conflict and ambiguity, job satisfaction, perceived communication, central life interests, and expectations about staying on or leaving the job. Some similar questions were asked about jobs or voluntary activities other than the focal job. This grant was for the purpose of analyzing these already collected data and for developing approaches to doing systematic research comparing part and full time employees.

PB80-177264 PC A03/MF A01
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the National Institutes of Health Clinical Center on April 21, 1979.
Final rept.,
John L. Bryan, and Philip J. DiNenno. Jan 80, 43p NBS-GCR-80-192
Contract NBS-7-9014
Sponsored in part by Department of Health, Education, and Welfare, Washington, DC.

This fire incident at the National Institutes of Health Clinical Center on April 21, 1979, was detected by a pharmacy technician on the ninth floor, west pediatrics nursing unit with the visual observation of smoke in the solarium lounge at approximately 1502. The technician immediately notified the charge nurse. The local alarm system was activated, which automatically transmitted an alarm to the National Institutes of Health Fire Department. Four ambulatory patients and two visitors were evacuated by the nursing staff and one ambulatory patient was evacuated by maintenance personnel. Bethesda Fire Department personnel rescued one infant. The Clinical Center was evacuated from the fourteenth through the third floors of approximately 184 patients and 50 visitors primarily by staff and NIH personnel in approximately 55 minutes. A total of seven persons was hospitalized for medical observation or treatment: four fire department personnel, one police officer, one visitor and one patient. The initial response by the National Institutes of Health Fire Department consisted of one engine and one ambulance with 5 personnel. The fire was extinguished by Bethesda Fire Department personnel with one 2 inch hose line from the standpipe system in stairway 7, in approximately 20 minutes. The fire damage in this 26 year old fire resistive building was limited to the solarium lounge and the corridor of the 9 west nursing unit.

PB80-810690 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Work Attitudes in the Military. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Mary E. Young. May 80, 269p
Supersedes NTIS/PS-79/0516 and NTIS/PS-79/0507.

The feelings of military personnel towards various aspects of their jobs are reviewed in the cited reports. Attitudes towards job opportunities and career ladders, compensation, and associated benefits, as well as specific innovative job aids are included. Opinions of civilian personnel employed

by military agencies are also surveyed. (This updated bibliography contains 263 abstracts, 46 of which are new entries to the previous edition.)

PB80-810708 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Work Attitudes in the Civilian Sector. 1978-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-May 80,
Mary E. Young. May 80, 107p
Supersedes NTIS/PS-79/0518 and NTIS/PS-78/0506. See also 1964-1977, NTIS/PS-79/0519.

Reports are cited on the opinions of jobs and the work environment of persons in the civilian labor force. Studies include surveys of professional people, young people, the hardcore unemployed, and minority groups, as well as individual industries. (This updated bibliography contains 99 abstracts, 28 of which are new entries to the previous edition.)

5K. Sociology

AD-A083 241/0 MF A01
Institute of Behavioral Sciences Honolulu HI
Person X Situation Research Strategies for Assessing Ethnocultural Factors in Social Competence.
Interim rept.,
Norman Dinges, Kenneth Tokuno, Lorraine Duffy, and Spero Manson. Oct 79, 26p Rept no. 2
Contract N00014-77-C-0345
Availability: Microfiche copies only.

Person x situation research strategies were used for assessing ethnocultural factors in social competence. Videotape vignettes depicting the responses of different Hawaiian ethnic groups to simulated problematic life situations were viewed by judges of similar and different ethnicity. Judge's perceptions of the internal states of the stimulus persons and of their response competence in problematic situations were obtained. Main effects due to situation and interaction effects for ethnicity of stimulus person and situation were found in a large number of competence judgements for different stimulus persons. Pattern differences for stimulus persons were detectable for situational content, situational difficulty, and scale items in the different categories of competence judgment. There were no significant differences for ethnicity of the judge in assessment of competence. These results are discussed in light of assumptions about ethnic similarity-dissimilarity in judgments of the internal states and the social competence of others. (Author)

PB80-159882 PC A21/MF A01
National Park Service, Philadelphia, PA. Mid-Atlantic Region.
Administrative History, Shenandoah National Park, 1924-1976,
Darwin Lambert. 27 Jan 79, 479p FNP-560-80-1

The report is on the administrative history of Shenandoah National Park (1924-1976). The report begins with a brief review of the early history of the area during the colonial era and concludes with the official recognition of the park's return to nature. The individual chapters concentrate on the development of a northern Virginia park, non-federal and fund-raising for the purchasing of park land, disputes on the boundary lines, the construction of the Skyline Drive, the CCC program, residents and resettlement, and the wilderness movement. The author concludes the report with a reflective look at the past and the questions concerning the future of the 'recycling park'. The report contains a chronology and a bibliography.

PB80-168305 PC E03/MF E03
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
The Forces of Urbanization under Varying Natural Increase and Migration Rates.
Final rept.,
Jacques Ledent. c1978, 65p RM-78-58

The paper seeks to shed some light on the question of whether a nation's urban population grows mostly by rural-urban migration or by natural increase. The discussion evolves around an analytical study of the Keyfitz model of urbanization, and the Rogers components-of-change model applied to a rural-urban system. The present paper allows the rates of natural increase and migration to vary. A larger part of the analysis is based on the Keyfitz model. In particular, the Keyfitz model is used in an attempt to connect the variations of rural-urban net migration rates to economic changes through a simple scheme of wage differentials, later supplement by the Todaro hypothesis.

PB80-168388 PC E03/MF E03
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
The Factors and Magnitude of Urbanization under Unchanged Natural Increase and Migration Patterns.
Research memo.,
Jacques Ledent. c1978, 66p RM-78-57

The paper is the second of a series intended to shed some light on the urbanization phenomenon. Its main purpose is to contrast the results provided by two alternative models--the model proposed by Keyfitz (1978) and the continuous version of the multiregional model of population growth and distribution developed by Rogers (1968)--under constant regimes of natural increase and migration. In both cases, the evolution of the magnitude of urbanization as well as that of the relative importance of natural increase and migration in accounting for urban growth are examined. The contrast between the alternative models is illustrated with the help of an application to two actual rural-urban population systems presenting polar characteristics: those of the USSR and India. (Copyright (c) 1978 IIASA.)

PB80-168396 PC E03/MF E03
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
The Dynamics of Two Demographic Models of Urbanization.
Final rept.,
Jacques Ledent. c1978, 65p RM-78-56

The paper examines and compares the dynamics of the Keyfitz and Rogers models on the basis of constant rates of natural increase and migration. It demonstrates the simplicity of their properties, especially in the case of the second model which also appears more realistic due to its symmetrical treatment of the rural and urban regions. In addition, it suggests, the ability of both models to give some insights into the relative rates of natural increase and in-migration in accounting for urban population growth.

PB80-168743 PC E05/MF E05
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Migration and Settlement: 2. Finland.
Final rept.,
K. Rikkinen. c1979, 128p RR-79-9
Prepared in cooperation with Helsinki Univ. (Finland). Dept. of Geography.

The report is part of the Comparative Migration and Settlment Study, in which case studies were made in 17 countries. It gives a detailed survey of patterns, issues, and policies of internal migration in Finland and investigates the current spatial population dynamics by applying multiregional demographic techniques.

PB80-169659 PC E03/MF E03
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Comparative Dynamics of Three Demographic Models of Urbanization.
Final rept.,
Jacques Ledent. c1980, 51p RR-80-1

The purpose of this report is to examine the process of urbanization from an analytical point of view. Such an objective is performed by examining and comparing the dynamics of recently devised models of rural and urban population change. For each of the three models considered, the analysis is established on the basis of a simple differential equation-describing the evolution of the urban to rural population ratio-which is arrived at by combining the original differential equations describing the rural and urban populations.

PB80-171044 PC A06/MF A01
General Accounting Office, Washington, DC. Health Resources Div.
Agencies When Providing Federal Financial Assistance Should Ensure Compliance with Title VI.
Report to the Congress.
15 Apr 80, 112p HRD-80-22

Title VI of the Civil Rights Act of 1964 prohibits discrimination based on race, color, or national origin in Federal financial assistance programs. Many agencies that provide such assistance were not certain which of their programs were subject to title VI, and some did not realize they had responsibility for determining compliance with title VI. In two programs GAO reviewed, the agency did not know, and GAO could not determine, if they were administered without discrimination.

PB80-174766 PC A07/MF A01
General Accounting Office, Washington, DC. Health Resources Div.
Increased Federal Efforts Needed To Better Identify, Treat, And Prevent Child Abuse And Neglect.
Report to the Congress.
29 Apr 80, 128p HRD-80-66

Child abuse and neglect--a serious nationwide problem--needs more Federal Government attention. State and local governments visited have made progress in dealing with the problem, but their capabilities to identify, treat, and prevent child abuse and neglect are inadequate. Although public awareness of child abuse and neglect has increased and improvements in dealing with it have been made, much more needs to be done. Professionals need to be made more aware of their responsibility to report suspected cases. Investigations of cases need to be made promptly, and agencies' capabilities to treat abused and neglected children need to be improved. The report also shows that until 1978 little emphasis was placed on prevention.

PB80-174972 PC A08/MF A01
Urban Inst., Washington, DC.
Emergency Energy Assistance Programs: Special Crisis Intervention Program (SCIP) and Emergency Energy Assistance Program (EEAP) Service Relative to Need and the Impact of State Policies on Service in SCIP.
Working paper,
Toby H. Campbell. Oct 79, 173p WORKING PAPER 1197-07, CSA-LN-2545
Grant CSA-31607

In 1977 and 1978 two crisis intervention programs were implemented by the Community Services Administration in an effort to assist low income households in paying high home energy bills. These programs were the Special Crisis Intervention Program (SCIP) of 1977 and the Emergency Energy Assistance Program (EEAP) of 1978. They were the first programs of their magnitude to provide direct assistance to households in paying for home energy. This report examines both the need for energy assistance during program years and service to households in each of these programs. The report analyzes allocations to states relative to need across states, unmet need for the nation as a whole, maximum payment amount per household relative to energy expenditures by the needy in different states, state participation in SCIP and EEAP, allocations to states relative to service, and a comparison of SCIP and EEAP in program service relative to need.

PB80-175573 PC A17/MF A01
Guam Territorial Crime Commission, Agana.
Criminal Justice Plan (1977).
1977, 379p
Library of Congress catalog card no. 78-623915. Sponsored in part by Law Enforcement Assistance Administration, Washington, DC.

The report includes a description of Guam's complete criminal justice system and plans for the future while requesting Federal grants.

PB80-175649 PC E05/MF E05
International Inst. for Applied Systems Analysis, Laxenburg (Austria).

Migration and Settlement: 4. German Democratic Republic.
Final rept.,
Gerhard Mohs. c1980, 119p RR-80-6

In the report the dynamics of multiregional population change in the GDR are analyzed. A system of five long-term economic planning regions constitutes the framework for the analysis. The author shows that the nation's population distribution is closely related to its pattern of industrial development and national policy.

PB80-176035 PC **E06**/MF **E06**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Migration and Settlement: 1. United Kingdom.
Final rept.,
P. H. Rees. c1979, 174p RR-79-3

The report analyzes population dynamics in the United Kingdom and discusses the effects of national population distribution policies. Conventional methods and recently developed multiregional techniques are used to explore the impacts of recent demographic changes. (Copyright (c) 1979, International Institute for Applied Systems Analysis.)

PB80-176241 PC **A08**/MF **A01**
Massachusetts Committee on Criminal Justice, Boston.
Descriptions of Projects Recommended for Support in 1977.
22 Nov 76, 175p

The report describes the programs endorsed by the Commonwealth Committee and available for funding. Programs range from the training of police personnel to the rehabilitation of delinquent youth.

PB80-178882 PC **A09**/MF **A01**
National Inst. on Drug Abuse, Rockville, MD. Div. of Research.
Drug Abuse Deaths in Nine Cities: A Survey Report,
Louis A. Gottschalk, Frederick L. McGuire, Jon F. Heiser, Eugene C. Dinovo, and Herman Birch.
Nov 79, 188p DHEW/PUB/ADM-80-840, RESEARCH MONO SER-29

The report presents the results of an epidemiologic study concerning 3000 drug abuse deaths in nine U.S. cities. It provides data on the circumstances of the deaths and procedures for their investigation.

PB80-927905 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
Kampuchea: A Demographic Catastrophe.
Research paper.
May 80, 27p GC-80-10019U
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-927900.

The estimated decline in the Kampuchean Population between 1970 and 1979 is unprecedented in any national population since World War II. Population estimates have been prepared for the period 1970 to 1979 using the 1962 census as a base. The December 1979 population is estimated to range between 4.7 million and 5.5 million persons, with the most likely estimate 5.2 million -- down from 7.1 million in 1970. Decimated by disease, famine, and war and bereft of its leaders and its labor force, Kampuchean society will need decades to recover, if it survives at all.

SHR-0002098 PC **A05**/MF **A01**
Illinois Dept. of Children and Family Services, Springfield.
Plan for Children and Family Services: Fiscal Years 1978 - 1980. Illinois Human Services Plan, Volume 1.
Jul 77, 85p
See also Volumes 2 - 13, SHR-0002216 -- SHR-0002227 and related document, SHR-0002228.

The plan for children and family services for fiscal years 1978 to 1980 of the Illinois Department of Children and Family Services (DCFS) outlines the past and current delivery of the DCFS services, and the proposals for future services. The DCFS provides social services to children and their families, operates children's institutions, and provides rehabilitative and direct child welfare services when not available through other agencies. The agency is also responsible for adjudicated neglected or dependent children, and children under age 13 who have been adjudicated delinquent. The DCFS proposes significant expansion of the family maintenance (inhome) services to keep families together whenever possible. By 1980, a 74 percent increase is foreseen in the number of recipients of family services. Greater public awareness about child abuse and neglect is increasing the number of reported cases, and additional staff resources will be needed for proper investigation and follow-up. The Department also proposes to purchase and provide better quality residential care, foster care, and adolescent training and support programs. The age of foster children will increase, and the collateral difficulties in caring for such children will necessitate greater supervision through private agencies. As the DCFS gradually shifts to early intervention services, the number of days of substitute care services will decrease, but the effects of union agreements and rising costs will offset possible savings in programs. Capital development plans and applicable statutes are appended.

SHR-0002216 PC **A04**/MF **A01**
Illinois Dept. of Public Aid, Springfield.
Plan for Public Aid Services: Fiscal Years 1978-1980. Illinois Human Services Plan, Volume 2.
Jul 77, 72p
See also Volume 1, SHR-0002098; Volumes 3 - 13, SHR-0002217 -- SHR-0002227; and related document, SHR-0002228.

The plan of the Illinois Department of Public Aid (DPA) for fiscal years 1978 to 1980 is 1 of 13 plans which outline the past and current delivery of human services in Illinois and identify proposals for the future delivery of these services. The DPA has been identified as the "designated" State agency for administration of the Social Security Act Title XX program, which provides reimbursement to States for social services rendered to low - income individuals. The agency has a county office in each of the downstate counties, and 23 offices in the Chicago area. The major services of DPA are directed at assisting eligible persons to become self - supportive and self - sufficient, and to provide protection, institutionalization, and community / home - based care as needed. Projected changes in service delivery during fiscal years 1978 to 1980 include the transfer of residential treatment and developmental disabilities programs to other agencies, and the decrease in family planning services. Substantial increases are foreseen in expenditures for education, training, and employment services, primarily due to increased Federal assistance through the Comprehensive Employment and Training Act. The DPA also plans experimental use of a computer - assisted information and referral system to enhance the statewide delivery of special services. Internal management improvements are also planned. Further discussion concerns capital expenditures, target group - problem analysis, and substate planning and service delivery areas. Appended material includes a list of applicable statutory provisions.

SHR-0002218 PC **A06**/MF **A01**
Illinois Div. of Vocational Rehabilitation, Springfield.
Plan for Vocational Rehabilitation Services: Fiscal Years 1978-1980. Illinois Human Services Plan, Volume 4.
Jul 77, 115p
See also Volume 1, SHR-0002098; Volume 2, SHR-0002216; Volume 3, SHR-0002217; Volumes 5 - 13, SHR-0002219 -- SHR-0002227; and related document, SHR-0002228.

This volume from the series on Illinois human services agencies outlines the past and current delivery of services by the Illinois Division of Vocational Rehabilitation (DVR), and identifies proposals for the future delivery of these services. During fiscal year 1976, the DVR maintained its commitment to the provision of services to the physically and / or mentally handicapped. It is the objective of the DVR to assist clients in becoming self - sufficient and active participants in the employment market. Forty - one area offices, housing from 3 to 17 counselors, are located throughout the State so that clients may obtain services within their home community. In a cooperative network with other social service agencies and facilities, DVR personnel strive to obtain the best assistance for their clientele. For 1979 and 1980, DVR will enhance the living potential of the disabled within their communities by providing employment skills through training, and opportunity for employment through public awareness campaigns. Under existing regulations the first priority for services must be given to the severely handicapped, then to public service employees, and then to the less handicapped. Alternatives, such as the use of external resources, are being considered to assist the marginally handicapped. Shifts in Federal policy will necessarily dictate funding availability. Additional discussion concerns agency organization, proposed internal management improvements, and target - group problem analysis. A summary of Statewide services is provided. Appended material includes a list of statutory provisions applicable to the DVR.

SHR-0002219 PC **A05**/MF **A01**
Illinois Dangerous Drugs Commission, Springfield.
Plan for Dangerous Drugs Services: Fiscal Years 1978- 1980. Illinois Human Services Plan, Volume 5.
Jul 77, 90p
See also Volume 1, SHR-0002098; Volumes 2 - 4, SHR-0002216 -- SHR-0002218; Volumes 6 - 13, SHR-0002220 -- SHR-0002226; and related document, SHR-0002228.

This volume from the Illinois Human Services Plan reports the actual levels of services provided during fiscal year 1976, and the estimates for 1977 and 1978 for the Illinois Dangerous Drugs Commission (DDC). As the single State agency for drug abuse prevention, planning and coordination within Illinois, the DDC allocates State and Federal funds, and is responsible for licensing, monitoring, and providing technical assistance. Drug abuse service delivery is to be coordinated through 11 health systems agencies as the long - range policy of the agency changes to an increased emphasis on substate planning. Four target populations warrant special attention. These groups are the urban minority youth, women who abuse tranquilizers, rural clientele, and the elderly who abuse licit drugs. It is noted that the proportion of women using opiates increases significantly as younger age groups are examined, with 45.7 percent of those persons under 21 years in treatment programs being women. President Carter's proposed drug abuse budget will allow Federal payment to Illinois of 70 percent of the 2400 treatment slots during the first half of 1978. Funding will also be available through Social Security Act Title XX. To maximize service delivery and identify unmet needs, the DDC has initiated interagency planning and coordination among private and State agencies, and will implement methods for sharing data and resources. Because three - fourths of the DDC clientele are located in or near Chicago, the majority of the treatment facilities are also located in that region. However, prevention facilities are more equally distributed. Tabular data is provided.

SHR-0002222 PC **A04**/MF **A01**
Illinois Dept. of Labor, Springfield. Bureau of Employment Security.
Plan for Employment Services: Fiscal Years 1978 - 1980. Illinois Human Services Plan, Volume 8.
Jul 77, 53p
See also Volume 1, SHR-0002098; Volumes 2 - 7, SHR-0002216 -- 2221; Volumes 9 - 13, SHR-0002223 -- SHR-0002227 and related document, SHR-0002228.

The Illinois Bureau of Employment Security is mandated by Federal legislation to provide job - finding and employment assistance to the citizens of Illinois. The Employment Service Division is organized into 5 substate areas with 71 local offices. The work incentive program (WIN) -- providing employment assistance to recipients of benefits under the aid to families with dependent children program -- is organized into 2 substate areas with 23 local offices. The five services offered by the bureau are occupational identification of applicants, employment counseling, employment test-

ing, referral and supportive services, and job placement. The goal of the bureau is the attainment of economic and social self - sufficiency for its clients, thereby eliminating their need for services provided by the agency. During fiscal year 1978 services will be directed to veterans, migrants, youth, unemployment insurance claimants, and other long - term unemployed in special applicant groups. The special applicant groups include the handicapped, minorities, economically disadvantaged, women, and older workers. WIN funding will be consolidated, and responsibility for preparing a WIN budget will be given to the bureau which will transfer funds to the Department of Public Aid. The bureau has initiated a program of organizational and management planning to expand the administrative capability so that management will be able to better utilize the limited resources available. The following critical issues will be addressed during the planning phase: services to local areas in accordance with demographic trends, improved coordination with Comprehensive Employment Training Act prime sponsors, expanded regional automation of the processing of employment services, and possible combination of field services with those of the unemployment insurance system. Tabular material is presented throughout the text, and appendices contain relevant statutory provisions, an organizational chart of the bureau, and maps and listings of employment service regions and WIN offices.

SHR-0002223 PC **A06**/MF **A01**
Illinois Governor's Office of Manpower and Human Development, Springfield.
Plan for Manpower and Human Development Services: Fiscal Years 1978-1980. Illinois Human Services Plan, Volume 9.
Jul 77, 115p
See also Volume 1, SHR-0002098; Volumes 2-8, SHR-0002216 -- SHR-0002222; Volumes 10-13, SHR-0002224 -- SHR-0002227 and related document, SHR-0002228.

This plan for manpower and human development services is one of 13 comprising the Illinois Human Services plan. The Government's Office of Manpower and Human Development (GOMHD) is responsible for administering the Federal Comprehensive Employment and Training Act of 1973 (CETA), and the Community Services Act. The purpose of this agency is to provide maximum employment opportunities for the unemployed, underemployed, and economically disadvantaged in all areas of the State not under the jurisdiction of a prime sponsor designated by the U.S. Department of Labor; to enhance the self - sufficiency of these target groups; to ensure a sequence of service which will assist these target groups to achieve or maintain economic self - support; and to establish effective coordination of State and local manpower and anti - poverty efforts. The Balance of State (BOS) prime sponsor area includes 70 of Illinois' 102 counties and is subdivided into regions for planning and service delivery within the BOS area. The State Economic Opportunity Office (SEOO), a division of GOMHD, has special responsibility derived from the Headstart, Economic Opportunity, and Community Partnership Act of 1974 to advise and assist the Governor and the Community Services Administration (CSA) on anti - poverty activity; to represent the interests and needs of the poor at the State governmenta level; to provide advice, training, and technical assistance to community agencies in the State; and to assist in monitoring and evaluating the programs of local agencies. Programmatic changes, the impact of anticipated Federal legislation / regulations, and new internal managerial improvements are projected, including the following: BOS prime sponsor division of GOMHD will be responsible for the administration of a new year - round, Federally funded youth employment program; the SEOO will be undertaking two new programmatic efforts -- a housing rehabilitation program for low - income rural residents and a rural transportation program for low - income elderly and physically handicapped rural residents; and the State Manpower Services Division, in conjunction with the BOS division, will participate in an expanded interagency coordination program. Statewide services are summarized with tables that show the number serviced, the level of expenditures, the method of service delivery, source of funds, and substate area distribution. Tables showing target groups and problem analyses, and service delivery areas are also included.

SHR-0002224 PC **A03**/MF **A01**
Illinois Commission on Human Relations, Springfield.
Plan for Illinois Commission on Human Relations: Fiscal Years 1978 - 1980. Illinois Human Services Plan, Volume 10.
Jul 77, 48p
See also Volume 1, SHR-0002098; Volumes 2 - 9, SHR-00002216 -- SHR-0002223; Volumes 11 - 13, SHR-0002225 -- SHR-0002227 and related document, SHR-0002228.

The Illinois Commission on Human Relations (ICOHR), created in 1947, is responsible for promoting goodwill and tolerance and encouraging interfaith and interracial communication through its services in housing, employment, and education. The commission has offices in Chicago and Springfield and serves the State through four service units: community development and planning, intake, community services, and communications. The commission's services are directed toward conciliation of employer - employee complaints, community planning assistance, public information, and assisting other agencies in providing quality service. Future plans for ICOHR continue to involve utilization of workshops to provide training, along with direct counseling and forums to serve the needs of clients. The agency plan, however, will be more concerned with employability of individuals, access to legal services, and affirmative marketing in housing. These services aim to increase opportunities for the individual or group to be included in the mainstream of life. Target groups include the aged, the poor, women, and minorities. The ICHOR works with local community relations commissions in eight substate areas to provide services to strengthen communities representing a mixture of geographic, racial, and economic factors within the State. The future direction of the agency is to extend outreach services for clients and to establish closer working relationships with other service providers in the public and private sectors. Tables and maps are included. Portions of this document are not fully legible.

SHR-0002226 PC **A03**/MF **A01**
Illinois Commission on Delinquency Prevention, Springfield.
Plan for Delinquency Prevention Services: Fiscal Years 1976 - 1980. Illinois Human Services Plan, Volume 12.
Jul 77, 49p
See also Volume 1, SHR-0002098; Volumes 3 - 11, SHR-0002217 -- SHR-0002225; Volume 13, SHR-0002227 and related document, SHR-0002228.

The Illinois Commission on Delinquency Prevention was established by the general assembly in January 1976 and is authorized to conduct a broad range of services. The purposes of the commission are to assist local communities in the development of programs for the prevention and control of delinquency and the rehabilitation of delinquents through community - based measures and to improve the capacity of local communities to deal effectively with social and economic problems related to youth. Priority for service is given to communities with high rates of crime, and the commission provides consultative service or grants to public and private organizations to initiate programs to alleviate causes of delinquency or reduce delinquency acts. The commission also conducts public education programs and maintains a statewide central records system of juvenile offenses. The commission's plan projects the following changes in service delivery: extending service to communities lacking organized groups of indigenous leaders to develop and maintain local programs for youth; extending service to communities lacking motivation or expertise in acquiring local funds and resources to support youth services programming; and extending the services of the Juvenile Officers Information Division to approximately 300 police and sheriff departments currently not participating in the program. Expansion of community service programs can be achieved through providing increased field staff to 20 additional communities, assisting local groups in securing funds to continue youth services on an ongoing basis, and increasing Juvenile Officers Information Division services to all police and sheriff departments in the State. The commission will continue to expand efforts to improve working relationships with public and private youth service agencies and to cooperate with other agencies in holding workshops, conferences, and seminars to plan delinquency prevention programs. The commission services the State through four regional substate areas, and funds are appropriated separately for each area. Numerous tables and maps are included.

SHR-0002227 PC **A03**/MF **A01**
Illinois Univ. at the Medical Center, Chicago. Div. of Services for Crippled Children.
Plan for Division of Services for Crippled Children: Fiscal Years 1978 - 1980. Illinois Human Services Plan, Volume 13.
Jul 77, 46p
See also Volume 1, SHR-0002098; Volumes 2 - 12, SHR-0002216 -- SHR-0002226 and related document, SHR-0002228.

The Illinois Division of Services for Crippled Children (DSCC) has been provided a broad mandate to service children with physical defects, disabilities, and handicaps who have need for special medical and related habilitative services. DSCC services are concerned with diagnosis, continued evaluation, and treatment often involving the provision of adaptive appliances and followup care. Two methods of service delivery are used: direct patient involvement by staff including organization of general and special field clinics primarily outside Chicago and purchase of medical and habilitative care on the basis of an individualized plan of services through private care sources. The State and Federal Governments provide most of the funding for services. DSCC is a centralized agency with a principal administrative office in Springfield and 10 field offices throughout the State. Approximately 384 general and special clinics per year are promoted by the field offices within 42 communities primarily within community hospitals. The immediate plan for providing services to crippled children involves eliminating differences between services to residents of Chicago and residents in other parts of the State. The program should also be expanded to concentrate on children with good habilitative potential and particularly to those suffering solely from visual disorders who presently do not receive services through the agency. In the long run, it is hoped that restrictive categorical eligibility criteria can be eliminated so that all handicapped children will be eligible for services. Tables provide background to expenditures by service, persons served by service, expenditures by method of service, number of persons served by method of service delivery, and expenditures by sources of funding for fiscal years 1976 through 1980. Additional tabular data and maps are included. Appendices list statutory provisions concerning crippled children services and an organizational chart of the DSCC.

SHR-0002228 PC **A08**/MF **A01**
Illinois State Dept. of Mental Health and Developmental Disabilities, Chicago.
Five Year Plan to Guide the Department of Mental Health and Developmental Disabilities in its Policies, Operations, and Administration: Fiscal Years 1976 - 1980.
Nov 76, 175p
See also related document, Illinois Human Services Plan, Volumes 1 - 13, SHR-0002098, SHR-0002216 -- SHR-0002227.

This 5 - year plan sets forth service and program plans of the Illinois Department of Mental Health and Developmental Disabilities to guide its policies, operations, and administration. The plan advances considerations relating to planning for mental health needs and resources and sets forth assumptions concerning delivery of services. Projected treatment programs will serve the alcoholic, the developmentaly disabled, and the mentally ill patient in terms of community - based programs, residential services, and program linkages. Issues involving definition and measurement of residential and outpatient services provide insights into estimates of the number of patients to be served during the 5 - year period. Implementation of the plan depends on legislative activity, changes in Federal law or policy, judicial decision, and response of community service providers. To emphasize the need for long - range planning, information is included on capital development aspects of maintaining residential facilities, fiscal implications of a 5 - year planning process, and special considerations regarding persons in community

residential facilities and children and adolescents. Recommendations concern the following: an examination of services rendered in State - operated residential facilities; justification for maintaining 28 State institutions in terms of the projected inmate population; assessment of available community services and provision of continual followup; review of issues concerning interagency interface and creation of a council composed of deputy directors of relevant agencies; commitment to prevention and ongoing programs and service plans for children and adolescents, and the establishment of a continuing planning and analysis unit. Appendices contain information on legislation, recommendations, prevalence rates, personnel, capital planning, utilization and expenditure data, and selected departmental statistical data. Maps and tables are included. (Author abstract modified).

SHR-0002880 PC **A10**/MF **A01**
Pacific Consultants, Berkeley, CA.
Social Services Reporting Requirements (SSRR): An Analysis of State Perceptions and Capabilities.
Thomas L. Foster. Mar 77, 201p
Contract DHEW-500-75-0034
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0002880/ES.

Indepth information was sought on problems associated with States' implementation of the Social Services Reporting Requirements (SSRR) system and the Individual Recipient Basic Data File (BDF) requirement. Involving onsite interviews in 15 States with 380 State and local social service professionals, the study was undertaken to help DHEW evaluate the validity of comments it has received regarding SSRR and to provide information on an appropriate phasein schedule for the BDF should a regulation on it become final. The SSRR system was designed to obtain basic information on primary recipients and other individuals receiving social services under Title IV and Title XX of the Social Security Act, determine costs of providing services, and establish a base for measuring goal achievement in both Title IV and Title XX programs. The BDF was conceived as a tool to aid State Title XX agencies in maintaining standard information on recipients of social services. It must contain the following information about recipients: identifying information, basis for eligibility, services provided, goal toward which services are directed, and provider agency for each service delivered. Interviews were conducted to assess the development of information systems by States and evaluate procedures used by States to obtain client - related and cost data on social service delivery. Consideration was given to costs of implementing SSRR and the BDF, quality of SSRR data, SSRR utility, BDF usefulness, confidentiality and privacy, and phasein requirements for SSRR forms. Although some States complied with SSRR, objections were raised regarding the need for and usefulness of data and the implementation of SSRR procedures and data elements. Most respondents expressed either positive perceptions of or optimistic expectations regarding the overall quality of data included in SSRR reports. Evidence indicated that SSRR did not provide useful information in many instances. Areas of data utility or potential utility, however, were planning, evaluation, resource allocation, information for legislatures, responding to outside requests for information, and budget justification. Recommendations to improve Federal reporting requirements are offered. An executive summary and tabular data accompany the report.

SHR-0002887 PC **A05**/MF **A01**
North Coast Opportunities, Inc., Ukiah, CA.
Mendocino County Economic and Social Planning Project.
Final rept.
Catherine Monroe. Aug 77, 99p

This economic and social planning (ESP) project was initiated to assist Mendocino County, Calif., in effectively allocating and utilizing resources to meet local needs. Specific project goals were to evaluate human service needs in the county (geographically and topically), identify economic and other resources, establish long - range goals for improving the quality of life, develop an evaluation system / matrix, and devise a human needs delivery systems coordinating model. The project's capacity - building activities were directed toward policy development and adoption, program planning and implementation, evaluation models, process institutionalization, and project model transfer. During the project's first year, consideration was given to existing data relevant to human service needs, socioeconomic conditions in the county, and service agencies. Household and agency surveys were conducted. Major tasks during the second year of the project focused on research on three priority areas of need (economic and employment development, housing and health), general policy guideline development, policy and action plan development, transfer, institutionalization, resource inventorying, needs assessment, evaluation, and revenue sharing review. Two major changes have taken place since the inception of the ESP project: (1) the establishment of a centralized evaluation unit within the county administrator's office, and (2) the initiation of program budgeting in five county departments. The project, as a partnership between county government and a local community action agency, was enhanced by the county's rural environment and the most successful activity was its transfer component. Narrative and tabular data and survey forms are provided. Portions of this document are not fully legible.

SHR-0002899 PC **A12**/MF **A01**
Coastal Bend Council of Governments, Corpus Christi, TX.
Human Resources Development: 1978 Annual Report.
Aug 78, 259p

The 1978 annual report of the Coastal Bend Council of Governments in the Corpus Christi, Tex., area is presented. The result of human resource planning and coordination since 1972 has been the development of the following capacity for local governments within the council of governments: (1) creation of a department of human resources and a full - time coordinator for human resource development planning and coordination, (2) establishment of a human resources development council, (3) comprehensive human resource planning process, (4) comprehensive guideline recommendation process, (5) comprehensive applications review process, (6) effective linkages for the implementation of guideline recommendations, and (7) joint planning and coordination with local citizens and human service organizations. Participation in the regional and local assessment of human needs during 1978 indicates that citizen involvement has been established and is growing. Elected and public officials and community leaders indicate an increased need for strengthening coordination and cooperation between human service providers and planning agencies. Nearly 50 percent of the council of government's guideline recommendations have been implemented by human service agencies or are being considered. No recommendations are contained in the report, but strategies for implementing guideline recommendations dealing with human resource development and capacity building, planning, coordination linkages, the clearinghouse process in human resource development, citizen participation in needs assessment, and regional interagency coordination in human resource development are detailed. Appendices contain data on selected social services by county, financial information on service programs, and a bibliography. Figures and tables accompany the text.

SHR-0002930 PC **A03**/MF **A01**
New York City Advisory Board to the Dept. of Mental Health, Mental Retardation and Alcoholism Services. Interagency Task Force on Problems of the Deinstitutionalized and the Chronically Mentally Ill.
Deinstitutionalization and the Community: The Interagency Task Force on Problems of Deinstitutionalization and the Chronically Mentally Ill.
Final rept.
17 Jul 78, 49p

This report of an interagency task force established by the Department of Mental Health, Mental Retardation and Alcoholism Services in New York City contains recommendations to improve predischarge planning, income support, residential option, and community support aspects of deinstitutionalization for mentally ill persons. Predischarge planning is viewed as an orderly process of planning initiated at the time of admission to inpatient facilities, involving patients, therapists, and community resources. It is implied in predischarge planning that individual patients leave the role of patients at discharge and become reintegrated into society. Patient rights are important in terms of advocating on their behalf or requesting the assistance of a facility staff advocate. The problem associated with residential options for former institutionalized patients is the limited nature of housing alternatives. The goal of all public agencies in the city should be to provide community support, thus assuring that sufficient funds and facilities are available on a timely basis to facilitate the transition from inpatient status to community life. Community attitudes toward former institutionalized patients are often negative, and these attitudes can be changed by community paticipation in the planning of residences and by community education. Problems concerning income supports are insecurity and dependency caused by inadequate income, lack of coordination between and among discharging hospitals and income support agencies, too few employment opportunities, and the fact that employed persons earning more than $2,900 per year are not covered by Medicaid except in cases of catastrophic illness. Community support system goals relate to social and vocational rehabilitation models, work evaluation, transitional and terminal sheltered workshops, job training, transitional employment, job placement and programming for group socialization, and life skills. The report contains 35 recommendations to improve the deinstitutionalization process data on discharges from psychiatric units in New York City in 1975 and on the cost of various living arrangements in New York State and a list of task force participants.

SHR-0002984 PC **A04**/MF **A01**
Montana State Office of the Governor, Helena. Office of Budget and Program Planning.
Evaluation of Deinstitutionalization in Montana: Summary of Findings.
Theodore H. Clack. 1977, 59p
Grant SRS-50-40311

This volume contains analyses of the structure and management practices of Montana's deinstitutionalization programs for developmentally disabled (DD) and emotionally disturbed (ED) individuals, of similar programs in other States, and of a sample of the professional literature concerning deinstitutionalization. The analyses of Montana's programs were accomplished through a review of relevant documents and personal interviews with principal actors in both programs. The DD program was found to be structurally and conceptually complex, comprising 4 departments of State government, a State advisory council, 5 regional advisory councils, a State office, 5 regional offices, and more than 40 nonprofit service organizations. This conceptual complexity contributes to the difficulty of defining specifically what the program is to accomplish and of assigning responsibilities and roles to program entities. The ED program is also structurally complicated, although not to the degree of the DD program. The Department of Institutions is responsible for the delivery of mental health services to ED persons. It provides both institutional services and community - based services through five regional mental health centers on contract to the department. The ED program also must take steps to define goals and objectives. The analysis of deinstitutionalization programs in other States was approached through mailed surveys to the Governor of each State. Results were received from 36 States regarding DD programs and 37 States regarding ED programs. Montana's programs are similar to those of other States in terms of assignment of administrative responsibility. Montana differs from most States in having created regional DD advisory councils, in separating responsibility for programs for DD and ED persons, in assigning responsibility for deinstitutionalization of ED persons to the Department of Institutions, and in having no umbrella human service agency. The literature review presents relevant findings regarding client and program characteristics in deinstitutionalization. Numerous recommendations are included.

SHR-0003007 PC A02/MF A01
Oklahoma State Dept. of Institutions, Social and Rehabilitative Services, Oklahoma City.
Towards Services Program Control.
By Alben Dombroski. 1978, 17p

This paper presents concepts being developed and used by the Oklahoma Department of Institutions to meet the Department's program control needs in social and rehabilitative services. These concepts involve the relationships between controls and information systems, and are being enacted through a department demonstration project for the testing of a client - centered data file (CCDF). Control concerns the direction and definition of the Social Security Act Title XX program in Oklahoma. The development of the Title XX Comprehensive Annual Services Plan is a program control function. A critical control device is the information systems, which in the CCDF project contains identifying and demographic data on clients. Program records are kept concerning eligibility, service plan, and outcome data. Attached to every client record is a record of the service received by the client during the data acquisition period. Linkages are maintained between the records systems. The CCDF data elements also include the condition of the client at entry and termination, and the objective of the service received. The use of these data will provide dynamic information for program control as it shows the movement expected and realized with every client. It also provides the department with information on the concentration of clients at various points in the program. Services included in the CCDF are not limited to those available under Title XX, but include Title IV - B care. Graphic data is provided.

SHR-0003021 PC A10/MF A01
National Inst. of Mental Health, Rockville, MD. Center for Studies of Crime and Delinquency.
Routinizing Evaluation: Getting Feedback on Effectiveness of Crime and Delinquency Programs.
Monograph
Daniel Glaser. 1973, 209p DHEW/PUB/ADM-76/369
One of a series on current issues and directions in the area of crime and delinquency.

Developed from research designs and procedures, this book sets forth concepts for effective evaluation of crime and delinquency programs. Although practitioners and research personnel agree on the need for collaboration in developing comprehensive crime control methods, both groups resist close oversight of their work. Effective evaluation will require various changes in the attitudes and accountability of agencies and the research community. Such changes include the shifting of philosophies of operation and the restructuring of organizations. With evaluation a requirement of programs receiving government support, specific requirements should include the reporting of relevant followup data on subjects of crime control studies, and the findings of alternative treatment projects within the funded program. Such additional reports would guide future investment for similar areas of study, or may specify more precisely the types of persons benefitted by the program. One recommendation features the initial use of small scale projects which are subjected to rigorous evaluation and adequately modified prior to full - scale deployment. Outside monitoring by separate agencies may be useful in reducing any conflicts of interest. Although subjective indicators of the effectiveness of a program should usually be avoided, they are easily obtained and may supplement objective criteria. Furthermore, no formal data on the success or cost benefit of a program will substitute for a thorough understanding of the program's clients and their socioeconomic status. Appended material includes forms from a U.S. Bureau of Prisons project. References are provided.

SHR-0003038 PC A02/MF A01
Office of the Assistant Secretary for Planning and Evaluation (HEW), Washington, DC.
Training and Employment Services Policy Analysis (T.E.S.P.A.): An HEW Response to National Studies of Sheltered Workshops.
Claude W. Whitehead. 25 Sep 78, 18p
Presented at the annual conference of the National Rehabilitation Association.

The report of the policy analysis activity of the U.S. Department of Health, Education, and Welfare (DHEW) concerning training and employment services for severely handicapped persons indicates that little or no progress occurred from 1967 to 1977 in the working conditions of these persons. A refinement of recommendations, however, will provide needed specificity and priorities which are capable of guiding improvements. The Training and Employment Services Policy Analysis (TESPA) program was designed to followup previous studies and develop specific proposals for implementation by Federal, State, and local agencies. TESPA review of programs indicated that the segregation of handicapped workers had not produced the benefits anticipated under the Fair Labor Standards Act, and that the community sheltered workshop was least effective in placing persons in competitive employment or providing them with comparable employment within the workshop. It is recommended that work activities center clients be integrated with other clients, and provided with commensurate wages. Program designs should emphasize upward mobility and training for more complex tasks. Working arrangements between DHEW and the Department of Housing and Urban Development are considered crucial to effective planning and implementation. An incentive program is needed to encourage facilities to move clients into competitive employment, with rehabilitation funds coming from Federal, State, and private sources. Further recommendations include reactivating statewide planning of workshops, and necessary amendments to the Social Security Act to authorize additional wage subsidies.

SHR-0003039 PC A05/MF A01
San Francisco Aid Retarded Children, Inc., CA.
Guide to Establishing an Activity Center for Mentally Retarded Persons.
Allan Bergman. 1977, 93p

The principle of normalization and the developmental model are accepted in the U.S. as key elements in designing programs and service delivery systems for mentally retarded persons. The principle of normalization involves utilizing means to establish behavior and characteristics which are as culturally normative as possible. The developmental model is based on the assumption that all retarded persons are capable of learning, growth, and development, and the following criteria are employed for establishing program goals under the model: (1) increase the complexity of the individual's behavior, (2) maximize human qualities, and (3) enhance the individual's ability to control his environment. A work activity center program should emphasize the individual's right to be provided with services designed to maximize his development, and a committee should be formed to plan and evaluate the need for a work activity center in the community. Evaluation involves gathering relevant psychological, social, and medical information plus specific vocational - related materials to provide a baseline assessment from which to develop the individual program. The program should include personal social adjustment training emphasizing the development of home living skills, travel skills, communication skills, academics, sexuality, and physical fitness. Work adjustment training should enhance self - concept, develop work skills, and provide motivation for continual development; vocational training should emphasize sequential, orderly, and systematic learning experience in the appropriate work setting for the developmental and economic needs of the individual. All aspects of administering an activity center are described including legal requirements and funding sources. Appendices contain a listing of major national organizations and agencies emphasizing the handicapped and bibliographical references.

SHR-0003040 PC A05/MF A01
National Association for Retarded Citizens, Arlington, TX.
Planning and Organizing a Sheltered Workshop for Mentally Retarded Persons.
Claude Whitehead. 1976, 83p

This manual provides resource information and recommendations for planning and organizing a sheltered workshop for mentally retarded persons. A sheltered workshop is defined as a work - oriented rehabilitation facility with a controlled working environment and individual vocational goals, which is designed to help the mentally retarded person progress toward normal living and productive vocational status. The transitional workshop intends to move the mentally retarded persons out of the workshop and into competitive employment in the community, and the extended employment workshop provides gainful employment to mentally retarded persons unable to achieve the transition to competitive employment. The major objective is to achieve successful employment within the workshop itself. In assessing the need for such workshops in a community, researchers should attain a clear understanding of community interest and support groups. Once the need is established, a planning committee should be formed that reflects a broad cross - section of the community. Next, a community survey should be conducted to explore the availability of qualified professional and technical personnel, the financial resource possibilities from both private and public sectors, and local and State agencies' services. Other considerations in setting up a sheltered workshop are Federal and State legislation and assistance programs; budgeting for buildings, equipment, and staff; contacts with industry and the possibilities of selling to Federal and State governments; the rehabilitation services to be offered, including medical and psychological evaluations; client wages, fringe benefits, and the role of supportive agencies and ancillary services; business and personnel management, which includes insurance, workmen's compensation, accounting, record keeping, and liability coverage; technical assistance resources such as consultants; public relations; and finally, standards, accreditation, and evaluation, to further develop workshop goals and to measure the program's effectiveness and to serve as guides for long - range planning. Appendices include a guide to organization, administration, incorporation, and by - laws; a list of national organizations and Federal agencies interested in the handicapped; and technical resource organizations. A bibliography and references are included.

SHR-0003043 PC A04/MF A01
Anoka County Human Services Management Team, MN.
Breaking from the Pattern of Historical Evolution and Providing a More Functional Approach to Human Services.
25 Apr 78, 57p

The Human Services Management Team of Anoka County, Minn. recommends the reorganization of the county's human services delivery system. Among the problems identified by the management team during its 1978 investigation were the need to improve communication among human service staff and the need to provide greater clarification of personnel roles and responsibilities. The major task in a reorganization of the system is to break from historical patterns and policies which emphasize optimum services at minimal costs. The system should be designed along clearly understood and functional guidelines. Arbitrary changes should be avoided. Specific recommendations provide for greater authority for human services management on the part of the county board, suggest that the board exercise its option to function under the Human Services Act, and urge that grants be sought to help integrate health services planning and budgeting. The resulting reorganization would be more efficient and would ensure maximum utilization of available funds, without increasing costs. A task force should study the feasibility of forming a joint intake unit for juvenile and adolescent services. Such a unit would improve communication and clarify personnel responsibilities. Appended material includes the results of staff questionnaires. Tabular data are provided.

SHR-0003073 PC A06/MF A01
Employment and Training Administration, Washington, DC. Office of Youth Programs.
Youth Initiatives.
1978, 120p

The first major Youth Initiatives report summarizes and highlights 8 months of planning, design and implementation of youth programs and efforts to expand and enrich the Job Corps. The planning charter for the Youth Employment and Demonstration Projects Act of 1977 (YEDPA) authorizes the Office of Youth Programs of the Department of Labor to conduct such programs and projects. Although the programs' effectiveness cannot yet be assessed, knowledge of youth problems has been

expanded, and a variety of experiments have been undertaken. There are also indications that youth training programs can reduce unemployment rates among young people. Severe unemployment is linked to feelings of despair and a loss of self - esteem among young people, and the YEDPA programs confront the unemployment problem by providing jobs and education. Jobs for youth still in school are supplemented with counseling and placement services. Participants are directly involved in the planning and program review processes through youth advisory councils. Half of the participants of the Young Adult Conservation Corps component are economically disadvantaged, and one - fourth are minorities. The Youth Incentive Entitlement Pilot Project, however, is limited to youth from poor families, and the Youth Community Conservation and Improvement Project emphasizes disadvantaged youth. The progams have been effective in coordinating education and training agencies, with minimal opposition from organized labor. Sponsors are planning an increase in the programs to a level of 335,000 cumulative participants under the Youth Employment and Training Program. Private sector linkages have been few in number, but encouraging in effect. Tabular data are provided.

SHR-0003345 PC **A03**/MF **A01**
Herner and Co., Washington, DC.
Child Abuse and Family Violence.
Annotated bibliography
Feb 78, 42p
Contract DHEW-105-76-1136

This annotated bibliography contains abstracts of books, journal articles, and research reports dealing with child abuse, wife abuse, and family violence in general. The 62 citations represent documents published in the United States, Canada, and Great Britain between 1970 and 1976. This information was selected from the data bases of the National Center on Child Abuse and Neglect, the American Psychological Association, the Educational Resources Information Center, the Law Enforcement Assistance Administration, the National Clearinghouse for Mental Health Information, and Sociological Abstracts, Inc. Abstracts from a bibliography produced by the Center for Advanced Studies in Human Services, University of Wisconsin, were also used. The preface was excerpted from the testimony of Douglas J. Besharov, Director, National Center on Child Abuse and Neglect, before the Committee on Science and Technology of the U.S. House of Representatives. In it Besharov reviews figures demonstrating the prevalence of family violence and gives examples of the type of work done in the organization's 20 Demonstration Treatment Centers. The testimony ends with a call for more centers and distinction between the types of treatment appropriate for spouse abuse and for child abuse. He maintains that a helping posture is most productive in child abuse cases, and that efforts should be made to restore the family. In spouse abuse cases society must provide shelters and the support necessary for the battered spouse to make an intelligent decision about staying or leaving the situation.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A083 148/7 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab Groton CT
Human Parotid Gland Alpha-Amylase Secretion as a Function of Chronic Hyperbaric Exposure,
S. C. Gilman, G. J. Fischer, R. J. Biersner, R. D.Thornton, and D. A. Miller. Jan 79, 8p Rept no. NSMRL-859
Pub. in Undersea Biomedical Research, v6 n3 p303-307 1979.

No abstract available.

AD-A083 461/4 Not available NTIS
National Research Council of Canada Halifax (Nova Scotia) Atlantic Regional Lab
Homonuclear 13C Decoupling in 13C Nuclear Magnetic Resonance Studies of Biosynthesis using Doubly Labelled Precursors. Assembly Pattern of the Acetate Units in Bikaverin,
A. Gavin McInnes, Donald G. Smith, John A. Walter, Leo C. Vining, and Jeffrey L. C. Wright. 8 Oct 74, 4p
Prepared in cooperation with Dalhousie Univ. Halifax (Nova Scotia). Dept. of Biology.
Availability: Pub. in Jnl. of the Chemical Society Chemical Communications, p66-68 1975.

No abstract available.

AD-A083 466/3 Not available NTIS
Saskatchewan Univ Saskatoon
Sensitivity of GABA Synthesis in Human Brain to Oxygen Poisoning,
J. D. Wood, S. J. Peesker, and B. Rozdilsky. 1975, 2p DRB-REPRINT-4137
Availability: Pub. in Aviation, Space, and Environmental Medicine, v46 n9 p1155-1156 Sep 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 469/7 Not available NTIS
National Research Council of Canada Ottawa (Ontario) Div of Biological Sciences
Evidence for the Release of Calcitonin and Parathyroid Hormone During Liver Regeneration in the Rat,
J. P. MacManus, T. Youdale, and B. M. Braceland. 20 May 74, 7p Rept no. NRCC-14485
Availability: Pub. in Hormone and Metabolic Research, v7 n1 p83-87 Jan 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 470/5 Not available NTIS
National Research Council of Canada Saskatoon (Saskatchewan) Prairie Regional Lab
A Comparative Study of Sugars and Sugar Alcohols on Cell Regeneration and Sustained Cell Division in Plant Protoplasts,
M. R. Michayluk, and K. N. Kao. 27 Nov 74, 8p Rept no. NRCC-14472
Availability: Pub. in Zeitschrift fuer Pflanzenphysiologie, v75 n2 p181-185 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

COO-2783-T PC **A03**/MF **A01**
Memorial Hospital, Pawtucket, RI. Div. of Hematologic Research.
Comprehensive Three Year Progress Report, August 1, 1975-October 31, 1978.
M. G. Baldini. 1978, 38p
Contract EY-76-S-02-2783

The major lines of investigation pursued during the past three years are listed here. A brief report and discussion on each subject of investigation is also given. Preservation and transfusion of viable human platelets studied were: improved preservation of platelets by freezing; and arrest and prevention of hemorrhage in alloimmunized thrombocytopenic patients. Basic studies of platelet function included: in vivo elution of exp 51 Cr from labeled platelets induced by antibody; platelet age and adhesion to collagen; effect of serotonin on cyclic nucleotides of human platelets; response of cyclic nucleotides to stimulation in stored human platelets; and effect of alpha -tocopherol on lipid peroxidation and platelet aggregation. Studies of cell-to-cell interaction using platelets as a model system took the form of: platelet interaction with tumor cells; and the effect of alpha -tocopherol on platelet membrane fluidity. (ERA citation 05:016736)

INIS-mf-4790 PC **A04**/MF **A01**
Isotopcentralen, Copenhagen (Denmark).
Measurements of Dinitrogen Fixation by the Acetylene Reduction Method and the exp 15 N Determination Method.
P. Pheiffer Madsen, T. Sevel, V. B. Jensen, and K. I. Dahl-Madsen. May 78, 52p
In Danish.
U.S. Sales Only.

Nitrogen fixation in Danish lake water is determined by two methods: by acetylene reduction and exp 15 N determination. exp 15 N determinations in gas and water were carried out by optical spectrometry using a commercial spectrometer. Measurements carried out in a Danish eutrophic lake demonstrate the applicability of the methods. Simultaneous determinations of acetylene reduction were performed. The results of the investigations substantiate the need for frequent calibration of the acetylene reduction method by the exp 15 N uptake method. (Atomindex citation 10:440356)

JEN-420 PC **A05**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Preparation of Glucose Uniformly Labelled with Carbon-14.
D. Garcia Pineda, C. Suarez, and E. Rodrigo Gonzalez. 1978, 86p
In Spanish.
U.S. Sales Only.

The plant (Zea mais, L) and culture conditions for an optimun production of glucose has been chosen. To achieve the labelling of glucose, photosynthesis and carboxylation are carried on under an artificial atmosphere of exp 14 CO sub 2 produced from exp 14 C-barium carbonate. Following photosynthesis, the sugars are extracted and then the extract purified by several methods. The purified glucose is, finally, degraded and the specific radiactivity is determined in each of its carbon atoms. (Atomindex citation 09:407262)

N80-21967/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Content of Lipids in Blood and Tissues of Animals During Hypodynamia.
I. V. Federov, Y. P. Ryinikov, and T. M. Lobova. Jan 80, 11p NASA-TM-76023
Contract NASW-3198
Transl. into English from Kardiologiya (USSR), V. 13, No. 7, 1973 p 50-54. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Experiments on 97 rats and 50 rabbits were undertaken to study the influence of hypodynamia on the lipid content in the blood, liver, heart, and in the aorta. Reduction of muscular activity contributed to the increase of cholesterol and beta lipoprotein levels in the blood and to accumulation of cholesterol in the liver and the heart. The total lipid content in these tissues decreased. In the aorta the total lipid content increased, while lecithin and cephalin figures went down. The character of biochemical changes in hypodynamia resembles in many ways the lipid metabolism changes in atherosclerosis.

PB80-184773 PC **A06**/MF **A01**
Hawaii Univ., Honolulu. Sea Grant Coll. Program.
Bubble Nucleation in Supersaturated Fluids,
Thomas D. Kunkle. Dec 79, 124p UNIHI-SG-TR-80-01, NOAA-80040710
Grants NOAA-04-3-158-29, NOAA-04-5158-17
Sponsored in part by Grant NOAA-04-6-158-44026.

An understanding of the physics of bubble formation is of importance in such diversified endeavors as propeller design, fluid flow, undersea medicine, and the brewing of beer. While the properties of preformed bubbles are well understood, relatively little is known about the physical mechanisms responsible for their creation. This publication reports on the principal results of a program designed to elucidate the nature of the bubble nucleation process, and it briefly explores the applicability of the findings to decompression sickness. An introduction to the physics of bubbles is followed by an outline of the theory of homogeneous nucleation. The results of an experimental program in which transparent gelatin was used to stabilize bubbles against floatation are reported. The existing models of cavitation nuclei are classified into four major groups, and each group is briefly discussed. The principal thesis of this work is advanced: that the cavitation nuclei present in common fluids consist of spherical gas phases encased in monomolecular skins of surface-active molecules. The surface-active material forming the skin of the nuclei observed in gelatin is shown to be similar to several commonly occurring surfactants, namely the saturated lecithins and phosphatidylethanolamines. The final chapter explores the application of the results of this research to the study of decompression sickness.

6B. Bioengineering

N80-21466/1 PC **A02/MF A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Improved Sample Management in the Cylindrical-Tube Microelectrophoresis Method.
A. J. K. Smolka. Feb 80, 12p NASA-TM-78269

A modification to an analytical microelectrophoresis system is described that improves the manipulation of the sample particles and fluid. The apparatus modification and improved operational procedure should yield more accurate measurements of particle mobilities and permit less skilled operators to use the apparatus.

N80-21972/8 PC **A03/MF A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Development of a Stereofluoroscopy System.
Final Report.
D. B. Rivers. Oct 79, 30p NASA-CR-160568
Contract NAS9-15287

A technique of 3-D video imaging, was developed for use on manned missions for observation and control of remote manipulators. An improved medical diagnostic fluoroscope with a stereo, real-time output was also developed. An explanation of how this system works, and recommendations for future work in this area are presented.

PB80-175268 PC **A04/MF A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Biomedical Research, Development, and Engineering at the Johns Hopkins University Applied Physics Laboratory.
Annual rept. 1 Oct 78-30 Sep 79.
Oct 79, 74p JHU/APL/MQR-79
See also PB-298 050.

The Medical Institutions of The Johns Hopkins University and The Johns Hopkins University Applied Physics Laboratory have developed a vigorous collaborative program of biomedical research, development, and systems engineering. An important objective of the program is to apply the expertise in engineering, the physical sciences, and systems analysis acquired by APL in defense and space research and development to problems of medical research and health care delivery. This program has grown to include collaboration with many of the clinical and basic science departments of the medical divisions. Active collaborative projects exist in ophthalmology, neurosensory research and instrumentation development, cardiovascular systems, patient monitoring, therapeutic and rehabilitation systems, clinical information systems, and clinical engineering. This application of state-of-the-art technology has contributed to advances in many areas of basic medical research and in clinical diagnosis and therapy through improvement of instrumentation, techniques, and basic understanding.

6C. Biology

AD-A083 177/6 PC **A08/MF A01**
Rosenstiel School of Marine and Atmospheric Science Miami FL
Functional Organization of the Retina of the Lemon Shark (Negaprion Brevirostris, Poey): An Anatomical and Electrophysiological Approach.
Technical rept. 1979-1980,
Joel Leonard Cohen. May 80, 155p Rept no. UM-RSMAS-80002
Contract N00014-75-C-0173
Doctoral thesis.

The retina of the lemon shark (Negaprion brevirostris) was studied by both anatomical electrophysiological techniques. Light and electron microscopy reveal the normal complement of retinal cells found in other vertebrate retinas. The finding of both rod and cone photoreceptor cells was confirmed with the use of the electron microscopic. The interplexiform cell, was described for the first time in an elasmobranch. Action potentials recorded from the ganglion cells revealed three types of responses: ON, OFF and ON-OFF. The ON center cells inputs had inputs from both rods and cones. Two classes of OFF center cells were found. One class had input only from one cone type while the second class had input from both rods and cone. The on component of the ON-OFF units had both rod and cone inputs, while the off component, as with the OFF center units were composed of two classes of units, those with just cone input and those with both rod and cone input. (Author)

AD-A083 278/2 Not available NTIS
Toronto Univ (Ontario) Dept of Parasitology
Fine Structure of Antennal Grooved Pegs of the Mosquito, Aedes aegypti,
Susan B. McIver. 3 Jun 74, 11p DRB-REPRINT-4082
Availability: Pub. in Cell and Tissue Research, v153 p327-337 1974 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 471/3 Not available NTIS
National Research Council of Canada Saskatoon (Saskatchewan) Prairie Regional Lab
Factors Affecting the Isolation and Callus Formation in Protoplasts from the Shoot Apices of Pisum sativum L,
Oluf L. Gamborg, J. Shyluk, and K. K. Kartha. 26 Dec 74, 8p Rept no. NRCC-14478
Availability: Pub. in Plant Science Letters, v4 p285-292 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

CONF-7909115-1 PC **A03/MF A01**
California Univ., San Francisco.
Cellular and Genetic Analysis of Mouse Blastocyst Development.
R. A. Pedersen, and A. I. Spindle. 1979, 46p
Contract EY-76-C-03-1012
Conference on cellular and molecular aspects of implantation, Houston, TX, USA, 17 Sep 1979.

The development of mouse embryos was studied by both cellular and genetic approaches. In the cellular analysis, determination of cell fate in blastocysts and in cell populations derived from them was studied in an attempt to estimate the time that these cells become committed to their fate. In the genetic analysis, existing mutations that are lethal to mouse embryos were used to discern essential features of early development. In this review, the timing of cell determination in the inner cell mass and the primary ectoderm, and the manifestation of defects in mouse embryos that are homozygous for the A/sup y/ allele of the agouti locus were considered. (ERA citation 05:014260)

CONF-800224-1 PC **A02/MF A01**
Oak Ridge National Lab., TN.
Diel Patterns of Ichthyoplankton Length-Density Relationships in Upper Watts Bar Reservoir, Tennessee.
G. F. Cada, J. M. Loar, and K. D. Kumar. 1980, 25p
Contract W-7405-ENG-26
Larval fish workshop, Oxford, MS, USA, 28 Feb 1980.

A diel ichthyoplankton sampling program was conducted in upper Watts Bar Reservoir during 1978 to obtain information on (1) diel changes in the abundance of fish larvae in the planktonic drift and (2) the extent of visually mediated sampling gear avoidance by motile larvae. Statistical comparisons among triplicate day and night samples revealed few significant diel differences in densities of individual taxa (all sizes combined). These same analyses, however, indicated consistently significant differences in the mean total lengths of fish larvae between day and night samples. Size-specific day-night density ratios were used to elucidate diel patterns in clupeid larval densities. It was determined that clupeids in the approximate length range of 5 to 8 mm were more abundant in surface samples during the day than during the night. Clupeid larvae either smaller or larger were relatively more abundant during the night. It is likely that the greater nocturnal densities of larger larvae were due to the inhibition of visual gear avoidance during the night. Although no direct evidence is available, we believe that diel vertical migration was also a major factor influencing the observed patterns in size-specific, day-night density ratios. (ERA citation 05:016691)

COO-3214-18 PC **A02/MF A01**
Iceland Univ., Reykjavik.
Research on Human Genetics in Iceland. Progress Report, October 31, 1979.
1979, 25p
Contract EY-76-C-02-3214

In the period 1978 to 1979 the work has continued as outlined in previous proposals. The general demographic register, which covers the Icelandic population from the year 1840 to present, was still improved. The register contains some 313,000 birth records, and they are kept either on magnetic discs, punched cards, or on written forms. The register was used to investigate the possible inheritance of disabilities and diseases as well as other characters and the effect of environment on man. (ERA citation 05:016719)

DOE/ER/73019-52 PC **A03/MF A01**
Washington Univ., Seattle.
Studies on the Control of Cell Wall Extension. Yearly Progress Report, September 1, 1978-August 31, 1979.
R. E. Cleland. 1979, 44p RLO-2225-019
Contract EY-76-S-06-2225-019

Research has been centered around the question as to how plant cell enlargement is controlled and regulated at the cellular level. Progress is reported on the following projects: proton permeability of plant cuticles; the control of osmoregulation in Avena coleoptiles; an analysis of the acid-extension curves. (ERA citation 05:016740)

DOE/EV/0243-1 PC **A02/MF A01**
Harvard Medical School, Boston, MA.
Studies of Membrane Structure by Freeze-Etching. Progress Report.
D. Branton. 1979, 9p
Contract EY-76-S-02-2423

The researchers devised a rapid procedure for measuring covalent bond breakage in a simple model system to determine the extent to which glycophorin was cleaved when the frozen vesicles were fractured. Evidence showed that no covalent bonds are broken during the fracture procedure. Membrane splitting was shown to be quantified under special circumstances when erythrocyte membranes are appressed to a polylysine-coated surface. Results show that freeze fracture at temperatures below that of liquid nitrogen results in the appearance of considerable detail on E faces of purple membranes. Detail seems to improve as the temperature is lowered, suggesting that the smooth E faces in conventional freeze fractures may be a result of plastic deformation and flow of membrane components. Results show that ultra-low temperature freeze-fracturing can reduce plastic distortion and, particularly when used in conjunction with rotary replication, should improve our ability to discern small labels attached to transmembrane proteins. (ERA citation 05:016744)

ORNL/TM-6927 PC **A10/MF A01**
Oak Ridge National Lab., TN.
Summer Habitat Selection by Striped Bass, Morone Saxatilis, in Cherokee Reservoir, Tennessee, 1977.
H. R. Waddle, C. C. Coutant, and J. L. Wilson.
Feb 80, 207p
Contract W-7405-ENG-26

Summer habitat selection patterns of 18 adult striped bass (Morone saxatilis) in Cherokee Reservoir were monitored with externally attached temperature-sensing acoustic or radio transmitters from June through September 1977. Mortalities of adult striped bass in this reservoir were hypothesized to be related to high summer temperatures and low dissolved oxygen (DO). The inhabited areas or refuges differed from noninhabited areas by maintaining temperatures less than or equal to 22 C and DO concentrations greater than 5 mg/liter. Total water hardness, pH, and water transparency were not significantly different among refuges and noninhabited areas. Movement of fish outside refuges occurred more frequently and for longer periods during June when the summer pat-

tern of high temperatures and low DO was less severe. Fish experienced temperatures between 15 and 27 C with mean temperatures of individuals ranging from 18.5 to 22.0 C. Several tagged fish migrated outside the refuges and selected the lowest available temperature, generally near 21 C, even though DO concentrations at these temperatures were 3 mg/liter or less. Long-term survival of tagged and nontagged fish outside refuges was undetermined because no fish were tracked outside a refuge for more than 12 days without being lost. This study indicates that temperature strongly influences the behavior of striped bass and that adults of this species may have a thermal preferendum of approximately 21 C. (ERA citation 05:016844)

PB80-170616 PC **A04**/MF **A01**
South Dakota State Univ., Brookings. Water Resources Research Inst.
Pheasant Use of Wetlands During the Winter and Application of Landsat Imagery for Assessing Winter Habitat.
Completion rept.,
Signe Sather-Blair, Raymond L. Linder, and Donald G. Moore. Feb 80, 65p W80-04544, OWRT-A-062-SDAK(1)
Contract DI-14-34-0001-7088

This study was designed to investigate (1) vegetative factors influencing ring-necked pheasant (Phasianus colchicus) use of wetlands during the winter, (2) the relationship of land use practices adjucent to wetlands and the use of such wetlands as winter cover by pheasants, and (3) the feasibility of assessing wetlands as pheasant winter habitat through the use of remote sensing data. Fifteen wetlands in Windsor Township, Brookings County, South Dakota, were randomly selected for study to estimate their use by pheasants. Use of cover types was analyzed by using multiple regression, chi-square, and t-tests. Correlation matrices were generated to locate significant relationships.

PB80-176126 PC **A04**/MF **A01**
New England Botanical Club, Inc., Cambridge, MA.
Rare and Endangered Vascular Plant Species in Massachusetts.
Final rept.,
Jonathan Coddington, and Katharine G. Field. 1978, 69p
Prepared in cooperation with Fish and Wildlife Service, Newton Corner, MA.

The report documents the known states of rare, threatened or endangered vascular plants in the State of Massachusetts. The report is based on a thorough review of the literature herbaria searches and field worth for selected species. Approximately 240 species are listed with their habitats, distribution, known localities and pertinent comments on the species status.

PB80-176175 PC **A03**/MF **A01**
New England Botanical Club, Inc., Cambridge, MA.
Rare and Endangered Vascular Plant Species in Connecticut.
Final rept.,
Leslie J. Mehrhoff. 1978, 48p
Prepared in cooperation with Fish and Wildlife Service, Newton Corner, MA.

The report documents the known status of rare, threatened or endangered vascular plants in the State of Connecticut. The report is based on a thorough review of the literature. herbaria searches and field work for selected species. Approximately 280 species are listed with their habitats, distribution, known localities and pertinent comments on the species status.

PB80-178627 PC **A15**/MF **A01**
Utah State Univ., Logan. Dept. of Wildlife Science.
Comparative Population Dynamics of Large Mammals: A Search for Management Criteria.
Final rept.,
Charles W. Fowler, W. Trent Bunderson, Marion B. Cherry, Ronald J. Ryel, and Benjamin B. Steele. May 80, 343p MMC-77/20
Contract MM7AC013

Theory and a review of published empirical information provide a basis for characterizing the population dynamics of large mammals. Large mammals exhibit a distinct pattern in which most density dependent change occurs at levels near the carrying capacity. Such populations are most productive when managed at levels reduced only slightly below naturally occurring levels. The management of marine mammal populations with a view toward maintaining the integrity and stability of the relevant ecosystems requires a knowledge of ecosystems which are only beginning to be obtained. A review of population models for large mammals shows very little uniformity in the approaches being taken. A bibliography of publications dealing with the population dynamics of large mammals, is included in this report.

PB80-180151 PC **A02**
North Carolina State Univ. at Raleigh. Sea Grant Coll. Program.
Cannibalism in Elvers,
Robert J. Wattendorf. Oct 79, 2p UNC-SG-R-140, NOAA-80032821
Grant NOAA-04-8-M01-66
Pub. in the Progressive Fish-Culturist, v41 n4 p218 Oct 79.

Five incidences were witnessed of elvers of the American eel (Auguilla rostrata) attacking other elvers and attempting to swallow them. Each of the victims soon died. In addition, 17 dead elvers were found with portions of their tails missing, which is attributed to cannibalism. These occurrences took place during a 24-week nutrition study which was conducted in eighteen 110 L (29-gal) glass aquaria. Due to the frequency of this previously unreported type of mortality, a further investigation of this behavior in anguillid culture systems may prove worthwhile to commercial interests.

PB80-180383 PC **A03**/MF **A01**
Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS.
A Mississippi Marine Finfish Management Plan,
David J. Etzold, and J. Y. Christmas. c1978, 43p MASGP-78-046, NOAA-80032702
Grant NOAA-04-8-M01-92

With increasing fishing pressure on Mississippi Gulf of Mexico finfish resources it is necessary to establish rational procedures for management if optimum yield from these resources is to be achieved. Mississippi Marine Conservation Commission (MMCC) selected spotted seatrout, sand seatrout, red drum, flounder, menhaden, southern kingfish, croaker, mullet, sheepshead, and black drum for consideration in this plan. This summary document lists the goal and objectives of the proposed State plan, and described the following sections. The present State management system is summarized with selected laws and regulations.

PB80-180599 PC **A09**/MF **A01**
Hammond (Katherine A. Green), Houston, TX.
Fisheries Management Under the Fishery Conservation and Management Act, the Marine Mammal Protection Act, and the Endangered Species Act.
Final rept.,
Katherine A. Green Hammond. May 80, 190p MMC-78/12
Contract MM1300885-3
Portions of this document are not fully legible.

The purpose of this report is to determine what steps might be taken to ensure that fishery management plans (FMPs) developed under the Fishery Conservation and Management Act (FCMA) are ecologically sound and fully consistent with the FCMA and with the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). The relevant provisions of the three Acts were examined and four FMPs were reviewed in detail. Persons involved in developing, reviewing and implementing FMPs were interviewed. It appears that FMPs are based primarily on single species rather than ecosystem oriented management concepts, so are not fully consistent with the FCMA, and that FMPs do not effectively incorporate potential impacts on non-target species into determining optimum fishery yields, so are not fully consistent with the FCMA or the ESA. In many cases data are sufficient for developing ecosystem oriented management plans. This report recommends that experts on marine mammals, birds, etc. become involved in FMP drafting, that guidelines for FMP preparation be amended to emphasize impacts on nontarget ecosystem components.

PB80-181720 PC **A02**
North Carolina State Univ. at Raleigh. Sea Grant Coll. Program.
The Relationship Between Mowing and Nitrogen Content in 'Myriophyllum spicatum L.',
W. Kirkham Sydnor, III. Oct 78, 10p UNC-SG-R-148, NOAA-80032816
Pub. in Cancas (Collegiate Academy of the North Carolina Academy of Science), v24 n1 p25-31 Oct 78.

The effects of mowing on nitrogen content in the aquatic weed, Myriophyllum spicatum, were studied during 1977. Seasonal variations in nitrogen in Najas guadalupensis were also considered. Samples were taken from unmowed control plots and plots mowed at various intervals throughout the growing season. No significant variation in percent nitrogen was found between M. spicatum samples taken from the plots of mowed plant material and the unmowed plots. The seasonal variation of both M. spicatum and N. guadalupensis remained constant except for a definite drop during June. The mean nitrogen levels in shoots of M. spicatum and entire plants of N. guadalupensis on a dry weight basis were 1.9% and 3.5% respectively.

PB80-182223 PC **A03**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Marine Fisheries Review. Volume 41, Number 10, October 79.
Oct 79, 46p NOAA-80032701
See also Volume 41, Number 9, PB80-163827.

In addition to its regular section, this issue contains the following articles: Interactions of marine mammals and Pacific Hake; Management for increasing clam abundance; The Japanese Longline Fishery in the Gulf of Mexico, 1978; and Boston fish pier landings, 1978: A review.

PB80-182256
(Order as PB80-182223, PC **A03**/MF **A01**)
National Marine Fisheries Service, Miami, FL. Southeast Fisheries Center.
The Japanese Longline Fishery in the Gulf of Mexico, 1978,
Allyn M. Lopez, David B. McClellan, A. R. Bertolino, and M. D. Lange. Oct 79, 7p NOAA-80032701-3
Included in Marine Fisheries Review, v41 n10 p23-28 Oct 79.

The general fishing operation of Japanese longline vessels is described and information is provided on the incidental catch of all species including billfishes and sharks. The typical Japanese longline fishing vessel operating in the Gulf of Mexico ranges from 50 to 70 m in length and is well equipped with radio and navigational equipment. The longline used by Japanese tuna vessels in the Gulf of Mexico consists of a main line suspended horizontally from the surface by floats and a series of branch lines (gangions) with baited hooks suspended from the main line. During the 1978 longline season, the vessels observed captured a total of 8,237 fish and 6 turtles. The target species from March to June was bluefin tuna; yellowfin tuna was the target species from June to July.

PB80-182264
(Order as PB80-182223, PC **A03**/MF **A01**)
National Marine Fisheries Service, Boston, MA. Market News Branch.
Boston Fish Pier Landings, 1978: A Review,
Donald A. Jerpi. Oct 79, 7p NOAA-80032701-4
Included in Marine Fisheries Review, v41 n10 p29-34 Oct 79.

Boston Fish Pier landings in 1978 were the heaviest since 1974 when 28.5 million pounds were landed. The 1978 value was the highest since 1967 when 77.9 million pounds landed brought $9.6 million to the fishermen. The 23% increase in landings in 1978 were due to two reasons: The increased number of trips by large and medium otter trawlers landed at Boston, and the turning back of the quota clock in October resulted in the landing of 7.3 million pounds of fish from October through December. Commencement of a new fishing year for quota purposes began 1 October 1978. The landed weights of all species was up except for blackback and lemon sole flounders. The de-

crease in lemon sole landings was partially due to the haddock quotas--vessels spent less time fishing eastern Georges Bank where most of the lemon sole are normally caught.

PB80-183320 PC A06/MF A01
Louisiana State Univ., Baton Rouge. Center for Wetlands Resources.
Common Vascular Plants of the Louisiana Marsh,
R. H. Chabreck, and R. E. Condrey. Dec 79, 122p LSU-T-79-003, NOAA-80040401

The purpose of this publication is to provide a simple field guide to the more common plants one would likely encounter in the Louisiana coastal marshes. Information on more than 100 plants is included, and in most cases descriptions are taken down to the species level. However, in several genera, descriptions are only presented at the generic level. For each plant the nomenclature, known occurrences, general characteristics, habitat requirements, and value are described on a separate page.

PB80-183486 PC A03/MF A01
National Marine Fisheries Service, Seattle, WA.
Marine Fisheries Review. Volume 41, Number 11, November 1979.
Nov 79, 45p NOAA-80041101
See also Volume 41, Number 9, PB80-163827.

In addition to its regular sections, this issue contains two articles on: The Groundfish Resources of the Eastern Bering Sea and Aleutian Islands Regions and The Cod Family and Its Utilization.

PB80-183494
(Order as PB80-183486, PC A02/MF A01)
National Marine Fisheries Service, Seattle, WA. Northwest and Alaska Fisheries Center.
The Groundfish Resources of the Eastern Bering Sea and Aleutian Islands Regions,
Richard Bakkala, Wendy Hirshcberger, and Katherine King. Nov 79, 25p NOAA-80041101-1
Included in Marine Fisheries Review, v41, n11 p1-24 Nov 79.

Commercial fishing for groundfish in the eastern Bering Sea dates back almost 100 years to 1882 when U.S. fishermen began harvesting Pacific cod, Gadus macrocephalus. The next fishery to develop in the region was the U.S. and Canadian fishery for Pacific halibut, Hippoglossus stenolepis, in 1928. Large-scale foreign fisheries began operations in the eastern Bering Sea in 1954, first exploiting flounders off Bristol Ba, but later expanding their fisheries throughout the eastern Bering Sea and Aleutian Islands regions, utilizing a wide variety of demersal species. Beginning in the mid-1960's, walleye pollock became the major target species of foreign fisheries and catches rose sharply as exploitation of this large resource intensified. Although current U.S. fisheries from groundfish in the eastern Being Sea and Aleutians are primarily limited to a setline fishery for Pacific halibut, domestic trawl fisheries for other species are expected to develop over the next decade.

PB80-183502
(Order as PB80-183486, PC A03/MF A01)
National Marine Fisheries Service, Gloucester, MA. Gloucester Lab.
The Cod Family and Its Utilization,
John J. Ryan. Nov 79, 13p NOAA-80041101-2
Included in Marine Fisheries Review, v41 n11 p25-26 Nov 79.

The cod family, from an economic point of view, is the most important of all the families of fishes. The members of the cod family are second only to the herring family in volume of commercial landings. In contrast to the herring family, almost all of the cod, haddock, hakes, and whitings are used for human food. Twenty-five species of fishes in the cod family, Gadidae, are listed by the American Fisheries Society. This article briefly describes the more important codfish and discusses cod as food, harvesting the cod, handling the catch, selling the catch, processing, parasites of the cod, and conservation.

PB80-184476 PC A05/MF A01
Washington State Dept. of Fisheries, Olympia.
Factors Leading to the Success of Japanese Aquaculture with an Emphasis on Northern Japan,
Medelon Green Mottet. Feb 80, 93p TR-52, NOAA-80042113

During the last several decades, Japan has been the world leader in aquaculture. Aquaculture has been a long-term growth industry, and since 1950 the growth rate, measured in tonnage, has been 12% a year. This growth was achieved despite the excessively high industrial development which has taken place during the same period along Japan's coasts. It is a relatively low-technology, low-capital, labor-intensive activity. There are many factors which have contributed to the growth of this industry including: (1) the unusual demand for quality fisheries products by the Japanese; (2) a long history of native inventiveness in the fisheries field; (3) government support of research, education, financing, and insurance; (4) fishery cooperative organizations which aid the culturists in many of the business aspects of their operations; and (5) institutional factors which reduce some of the problems associated with common property resource management.

PB80-184591 PC A22/MF A01
Smithsonian Institution, Washington, DC.
A Revised Handbook to the Flora of Ceylon. Volume I.
cFeb 80, 521p TT-78-52029/01
Trans. of Sri Lanka Jnl. Sponsored in part by Sri Lanka Univ., Peradeniya.

Contents:
- Amaranthaceae;
- Bombacaceae;
- Clusiaceae;
- Compositae;
- Connaraceae;
- Convolvulaceae;
- Dipterocarpaceae;
- Elatinaceae;
- Fabaceae;
- Mimosaceae.

SAN-0326-T1 PC A02/MF A01
Stanford Univ., CA. Dept. of Genetics.
Mutation Rates and Mutational Loads in Man. Annual Progress Report of Scientific Activity, 1978-79.
L. L. Cavalli-Sforza. 1979, 7p
Contract EY-76-S-03-0326-033

Gene frequency maps have been constructed with computer-assisted analysis for all aboriginal populations of the world. Selective effects of climate were studied. Theoretical studies extended to behavioral variations in learning and in acquisition of viral and infectious diseases. (ERA citation 05:016746)

6D. Bionics

PB80-810641 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Bionics. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
Brian Carrigan. May 80, 138p
Supersedes NTIS/PS-79/0568 and NTIS/PS-78/0550.

Recent advances in visual information processing, electronic models of nerve cells, and biological sonar systems are discussed in these citations. Theory and applications are included, along with computerized simulation and signal processing. Electrophysiology and modelling of the central nervous system are also included. (This updated bibliography contains 132 abstracts, 12 of which are new entries to the previous edition.)

6E. Clinical Medicine

AD-A083 049/7 PC A02/MF A01
Columbia Univ New York Div of Tropical Medicine
Lassa Fever Immune Plasma.
Progress rept. no. 1 (Annual), 1 Jan-31 Jul 79,
John D. Frame. Aug 79, 20p
Contract DAMD17-79-C-9024

Lassa fever immune plasma is being obtained in Liberia, West Africa for the U.S. Army Medical Institute of Infectious Diseases by Columbia University associated with the Liberian Institute for Biomedical Research (LIBR). Additionally, epidemiological investigations of Lassa virus infections are proceeding in that country. Indirect fluorescent antibody testing is being carried out at the LIBR by a Liberian team trained by personnel from VILAB II of the New York Blood Center. Field epidemiological investigations are being conducted by the Liberian team and the Principal investigator. (Author)

AD-A083 058/8 Not available NTIS
Defence Research Establishment Suffield Ralston (Alberta)
Persistence of Human Enteric Bacteria in the Canadian North,
Lloyd A. White, and Melvin R. Spence. 1975, 5p
Abstract in French.
Availability: Pub. in The Canadian Jnl. of Public Health, v67 p25-29 Jan-Feb 76 (No copies furnished by DTIC).

No abstract available.

AD-A083 100/8 PC A06/MF A01
Army Inst of Dental Research Washington DC
Annual Research Progress Report 1 October 1977 - 30 September 1978.
1 Oct 78, 116p

Studies were directed toward improving oral health care delivery to the soldier in the field. These initiatives include methods, materials and hardware designed specifically to meet the problems anticipated in providing effective oral health care in the combat environment. Qualitative and quantitative data are being developed to define and pinpoint present and future obstacles to oral health care delivery. A pulse-pressure water lavage method is being extended to decontamination of the field soldier exposed to toxic materials and an x-ray intensification device which may provide a portable system of immediate x-ray diagnosis useful under field conditions. Uses for biodegradable PLA-PGA copolymers or single polymers alone as hollow organ devices, medicament-carrying wound coverings, fixation devices in maxillofacial wounds and slow-drug-release systems are continuing to show positive results. The drug DMPS which has been found to be superior to BAL and administerable under field conditions for treating mercury and arsenic toxicity has also been found useful in nickel, cadmium and copper detoxification. Several method studies of importance to supporting the soldier in the field include ways of preventing cross-contamination in the use of N2O anesthesia apparata, the rapid serologic identification of infectious organisms under field conditions and means of improving casting accuracy of oral prostheses in the field.

AD-A083 141/2 PC A03/MF A01
Army Natick Research and Development Command MA Food Engineering Lab
Entree Production Guides for Modified Diets at Walter Reed Army Medical Center. Part V. Renal Diet Items.
Final rept.,
Jessie McNutt, Margaret Branagan, John McPhee, Lucy Albertini, and Mary Klicka. Dec 79, 47p NATICK/FEL-103, NATICK-TR-79/014
See also Part 1, AD-A079 949.

At the request of the Walter Reed Army Medical Center, production guides for modified or restricted diets have been developed at NARADCOM. This report includes production guides for eight entrees and one dessert item, designed for patients on a Renal Diet. The products are portioned into individual servings and then frozen. A panel of food technologists has evaluated samples for color, odor, flavor, texture, and appearance, initially, and after storage at 0 F (-18 C) for 3 months, 6 months, and 12 months. Based on these technological evaluations, there were no significant sensory changes in the products over a one-year storage period at 0 F (-18 C). These nine production guides are written in percentages, 25 servings and single servings. They are restricted in protein, sodium, potassium, and water, with calories as high as feasible. Nutrient analysis of each serving is included. (Author)

AD-A083 215/4 Not available NTIS
Flying Personnel Research Committee London (England)
Core Temperature Measurement in Man,
R. J. Edwards, A. J. Belyavin, and M. H. Harrison. Mar 78, 9p Rept no. FPRC/1366
Availability: Pub. in Aviation, Space, and Environmental Medicine, v59 n11 p1289-1294 Nov 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 323/6 PC **A04**/MF **A01**
Frank J Seiler Research Lab United States Air Force Academy CO
Histopathological and Ultrastructural Studies of Liver Tissue from TCDD-Exposed Beach Mice (Peromyscus polionotus).
Final rept. 1974-1977,
Lorris G. Cockerham, Alvin L. Young, and Charles E. Thalken. Mar 80, 61p Rept no. FJSRL-TR-80-0008

Quantitative ultrastructural studies were conducted on liver tissue from beach mice, Peromyscus polionotus, exposed to the toxin 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in field and laboratory environments. Hepatic tissue from 52 animals was examined for changes in smooth endoplasmic reticulum (SER), rough endoplasmic reticulum (RER), and mitochondria. Fifteen of 30 animals were collected from a unique military test site in northwest Florida where they had been continuously exposed to soil levels of 10 to 710 parts per trillion (ppt) TCDD. Twelve of 22 animals were exposed 10 times in 28 days to 2.5 parts per billion (ppb)TCDD applied as a dust to their pellage. All remaining animals were from either a field control site or not exposed to TCDD in the laboratory. All tissue was examined both histopathologically and by an ultrastructural stereological technique. No significant histopathological or ultrastructural changes were found in hepatic parenchymal cells after long term, low level exposure to TCDD in the field, or after short term, low level exposure in the laboratory. Statistically significant differences in liver weight to body weight ratios concurrent with the absence of cellular changes following exposure to TCDD in the field is explained by the low level of exposure.

AD-A083 351/7 Not available NTIS
Army Medical Research Inst of Infectious Diseases Frederick MD
Phagocytosis and the Metabolic Sequelae of Infection
Michael C. Powanda, Karen A. Bostian, Richard E. Dinterman, Wallace G. Fee, and John P. Fowler. 3 May 79, 16p
Supersedes report dated 25 Mar 79, AD-A068 790.
Availability: Pub. in Jnl. of the Reticuloendothelial Society, v27 n1 p67-82 Jan 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 352/5 Not available NTIS
Army Medical Research Inst of Infectious Diseases Frederick MD
Evaluation in Humans of a New, Inactivated Vaccine for Venezuelan Equine Encephalitis Virus (C-84),
Robert Edelman, Michael S. Ascher, Charles N. Oster, Helen H. Ramsburg, and Francis E. Cole. 23 Aug 78, 8p
Supersedes report dated 21 Aug 78, AD-A059 751.
Availability: Pub. in Jnl. of Infectious Diseases, v140 n5 p708-715 Nov 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 473/9 Not available NTIS
Army Medical Research Inst of Infectious Diseases Frederick MD
Endogenous Mediators of Fever-Related Metabolic and Hormonal Responses,
William R. Beisel, and Philip Z. Sobocinski. 1980, 10p
Supersedes report dated 3 Apr 79, AD-A068 792.
Availability: Pub. in Fever, p39-48 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 474/7 Not available NTIS
Army Medical Research Inst of Infectious Diseases Frederick MD
Glucose and Alanine Metabolism During Bacterial Infections in Rats and Rhesus Monkeys,
Robert W. Wannemacher, Jr., Franics A. Beall, Peter G. Canonico, Richard E. Dinterman, and Clayton L. Hadick. 2 Aug 78, 12p
Supersedes report dated 24 Jul 78, AD-A059 371.
Availability: Pub. in Metabolism, Clinical and Experimental, v29 n3 p201-212 Mar 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 503/3 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Ketamine and Thiopental Sleep Responses in Guinea Pigs in Hyperbaric Helium-Oxygen.
Medical research progress rept.,
L. E. McCracken, H. F. Nicodemus, R. E. Tobey, and R. C. Bailey. May 77, 13p Rept no. NMRI-79-98
Pub. in Undersea Biomedical Research, v6 n4 p329-338 Dec 79. Summary in French.

No abstract available.

AD-A083 505/8 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Measurement of Erythrocyte 2,3-Diphosphoglycerate with a Centrifugal Analyzer.
Medical research progress rept.,
Thomas M. Hickey, David E. Uddin, and Lutz A. Kiesow. 1 Feb 79, 7p Rept no. NMRI-79-97
Pub. in Clinical Chemistry, v25 n7 p1314-1317 1979.

No abstract available.

AD-A083 507/4 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Effect of Hyperbaric Helium on Anesthetic Action of Thiopental.
Medical research progress rept.,
R. E. Tobey, L. E. McCracken, A. Small, and L. D. Homer. 1979, 9p Rept no. NMRI-78-127
Pub. in Underwater Physiology, VI, p579-585 1978.

No abstract available.

AD-A083 508/2 PC **A02**/MF **A01**
New York Medical Coll NY
Dissociation of Rat Colonic Mucosa into Single Epithelial Cells and Their Microscopic Visualization.
Medical research progress rept. (Final).
Anthony Herp, Vera Perret, and Eva Suba. 4 Apr 79, 5p NMRI-79-104
Contract PHS-CA-17168
Pub. in Microscopica ACTA, v82 n3 p251-253 Nov 79.

No abstract available.

AD-A083 509/0 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Management of War Injuries to the Jaws and Related Structures.
Medical research progress rept.,
Robert G. Triplett. 1978, 7p Rept no. NMRI-79-101
Pub. in revue Internationale des Services de Sante des Armees de Terre de Mer et de l' Air, v52 n11 p843-846 1979. Presented at the Meeting of the Commission on Armed Forces Dental Services of the Federation Dentaire Internationale, held in Madrid, Spain, September 1978.

No abstract available.

AD-A083 510/8 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Membrane Orientation and Location of Multiple and Distinct Allotypic Determinants of Mouse Lymphocyte IgD.
Medical research progress rept.,
Steven W. Kessler, Virgil L. Woods, Fred D. Finkelman, and Irwin Scher. 27 Jul 79, 10p Rept no. NMRI-79-100
Pub. in The Jnl. of Immunology, v123 n6 p2772-2778 Dec 79.

No abstract available.

AD-A083 562/9 PC **A02**/MF **A01**
Army Medical Research Inst of Infectious Diseases Frederick MD
Sensitivity of Selected Arenaviruses to a Human Interferon.
Interim rept.,
Bruno J. Luscri, Orville M. Brand, and Gerald A. Eddy. 25 Feb 79, 16p

Assessment of arenavirus sensitivities to an interferon (IF) of human cell culture origin was accomplished by a plaque reduction (PR50) method in cells of monkey (BS-C-1) and human origin (Detroit 532). Arenavirus sensitivity to the human IF was compared in parallel titrations to the IF sensitivity of vesicular stomatitis virus (VSV). Interferon bioassays in both cell types indicated that all arenavirus members were less sensitive to IF of human origin than was the standard challenge virus, VSV. Bioassay of human IF on BS-C-1 cells provided a wider spectrum of interferon sensitivity among the various arenavirus members than that shown for Detroit 532 cells. There was no apparent correlation between human IF sensitivity and human virulence with the arenaviruses tested. (Author)

HRP-0501501/1 PC **A05**/MF **A01**
Visiting Nurse Association of Omaha, NE.
A Classification Scheme for Client Problems in Community Health Nursing.
Nurse planning information series,
DeLanne A. Simmons. Jun 80, 96p DHHS/PUB/HRA-80-16, NPIS-14
Contract PHS-231-77-0068

The manual presents a classification of client problems addressed by community health nurses. The classification was developed by the Visiting Nurse Association of Omaha from empirical data gained in home visits by staff nurses to 338 families. The classification scheme was tested at the Visiting Nurse Association of Omaha and at three collaborating agencies: the Des Moines Public Health Nursing Association; the State of Delaware Department of Health and Social Services, Division of Public Health; and the Dallas Visiting Nurse Association. The scheme was then revised and retested. The non-exhaustive classification scheme consists of thirty-eight problems with signs and symptoms which are nearing mutual exclusivity. It is divided into four domains reflecting the areas in which community health nurses gather and assess data. Each problem may be referenced to an individual or family and may be designated as an actual or potential problem. The manual contains a description of the classification scheme and its development and information necessary for implementation and computerization of the scheme by community health agencies.

HRP-0901556/1 PC **A14**/MF **A01**
Southern New Jersey Health Systems Agency, Bellmawr.
Health Systems Plan for 1979-1984. Health Service Area 5 New Jersey. Volume II. Appendices. 2nd Edition.
1979, 320p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also Volume 1, HRP-0901557.Portions of this document are not fully legible.

Narrative, tabular, and graphical information is presented in these appendixes to the health systems plan prepared by the Southern New Jersey Health Systems Agency. The information deals with health services in the area in relation to national guidelines for health planning, demographic and socioeconomic characteristics of the population, mortality in general and by disease category, infant mortality, infant deaths and death rates, fetal deaths and death rates, neonatal deaths and death rates, postneonatal deaths and death rates, hypertension, cancer, syphilis, gonorrhea, pneumonia and influenza, days lost from work, disability, accidental deaths, dental health status of children, admissions and readmissions to psychiatric hospitals, mental health care demands and the severity of mental illness, crime, school health education, fluoridated water supplies, prenatal care, immunizations, screening and referral of children, protective services for children, emergency medical services and ambulances, computed tomographic scanners, short-stay psychiatric beds needs, alcohol and drug abuse, primary care phys-

cians, hospital peer groups, perinatal service regionalization, end-stage renal disease, radiation therapy, support services for the elderly and disabled, sheltered and long-term facilities, health maintenance organizations, and health care expenditures.

HRP-0901557/9 PC A09/MF A01
Southern New Jersey Health Systems Agency, Bellmawr.
Health Systems Plan for 1979-1984 and Annual Implementation Plan for 1979. Health Service Area 5 New Jersey. Volume I. 2nd Edition.
29 Jan 79, 199p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also Volume 2, HRP-0901556.

The health systems plan (HSP) and the annual implementation plan (AIP) of the Southern New Jersey Health Systems Agency are combined in this volume. Introductory comments prefacing the HSP concern the purpose of the plan, organization and content of the plan, national health priorities and guidelines, and the planning process. Demographic, socioeconomic, and transportation characteristics of the health service area are described. Goals, objectives, and recommended actions are delineated in sections on health status and the health system. Specific health status indexes include infant mortality, cardiovascular and cerebrovascular disease, cancer, infectious disease, physical disability, accidents, oral health, nutritional status, mental health, drug abuse, and alcoholism. The analysis of the health system covers community health, prevention and detection, diagnosis and treatment, habilitation and rehabilitation, maintenance ancillary services, and health system development. The AIP articulates goals, objectives, and recommended actions pertinent to infant mortality, child health, alcohol and drug abuse, mental health, hospital costs, habilitation and rehabilitation, long-term institutionalization, and long-term support services.

HRP-0901654/4 PC A11/MF A01
Greater St. Louis Health Systems Agency, Inc., MO.
Health Systems Plan. Health Service Area 3 Missouri. Appendix. 2nd Edition.
1979, 249p
See also HSP, HRP-0901656, and AIP, HRP-0901655.Portions of this document are not fully legible.

Supplementary information contained in an appendix to the health systems plan of the Greater St. Louis Health Systems Agency focuses on prevention and promotion, ambulatory care, maternal and child health, mental health, emergency medical services, and long-term care. Tabular and narrative data describe the population of the health service area by county, the recording and analysis of health data, health education and information, environmental health, personal health services, health facility operation, the coordination of services and resources, physician to population ratios, medical underservice and critical health manpower shortage areas, and Medicare and Medicaid. The data also describe the population by infant mortality, neonatal mortality, fetal mortality, birth rates, marital status, crisis intervention, growth and sustenance services, case management, planning, community development, health manpower career development, health manpower education and training, mental health facilities, ambulance services and emergency care capabilities, and the elderly population and nutrition programs for this group.

HRP-0901655/1 PC A04/MF A01
Greater St. Louis Health Systems Agency, Inc., MO.
Annual Implementation Plan for 1979. Health Service Area 3 Missouri.
1979, 61p
See also HSP, HRP-0901656, and Appendix, HRP-0901654.

A guide to the annual implementation plan (AIP) of the Greater St. Louis Health Systems Agency defines the AIP and the health systems agency, notes procedures for using the AIP, and articulates what can be found in the AIP. Priorities for action are indicated at four levels: (1) resources necessary to complete a project; (2) resources necessary to make significant progress toward the completion of a project; (3) resources necessary to maintain some community activity related to a project; and (4) know resources to be committed. Objectives and milestones specified in the AIP follow the organization of the health systems plan. They concern acute care, ambulatory care, emergency medical services, illness prevention and health promotion, long-term care, maternal and child health, Medicaid, and mental health. Resource requirements pertinent to these areas, as well as project review priorities are identified. The process of evaluating the AIP is detailed.

HRP-0901656/9 PC A99/MF E04
Greater St. Louis Health Systems Agency, Inc., MO.
Health Systems Plan. Health Service Area 3 Missouri. 2nd Edition.
1979, 1060p
See also AIP, HRP-0901655, and Appendix, HRP-0901654.Portions of this document are not fully legible.

The health systems plan (HSP) of the Greater St. Louis Health Systems Agency begins with introductory information on the need for health planning, national and State health priorities, and demographic and economic characteristics of the health service areas. Attention is also given to objectives of the health systems agency, the plan development process, and purposes of the HSP. Components of the HSP that relate to health status and the health system are: (1) illness prevention and health promotion--leading causes of death, immunizable diseases, childhood lead poisoning, and school health; (2) acute care--medical/surgical, obstetric, pediatric, psychiatric, and end-stage renal disease services and health care technology; (3) ambulatory care--primary health care, availability and accessibility issues, health manpower, and the distribution of medical services; (4) maternal and child health--health status indicators, health system indicators, and goals and 'ong-range recommended actions; (5) mental health--types of behavior, mental health care funding, and mental health needs; (6) emergency medical services--coordination among providers of service, categorization of emergency room services, and communication at all levels of the emergency medical service system; and (7) long-term care--licensed nursing homes, home health services, adult day care centers, and congregate meals.

HRP-0901802/9 PC A15/MF A01
Wyoming Health Systems Agency, Inc., Cheyenne.
Health Systems Plan and Annual Implementation Plan for 1979. Health Service Area 1 Wyoming.
1979, 350p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Health status and the health system constitute the focus of this combined health systems plan (HSP) and annual implementation plan (AIP) for residents served by the Wyoming Health Systems Agency. The introduction to the HSP discusses the authority for health planning, the health systems agency, the State health planning and development agency, and the statewide health coordinating council, and considers the HSP's purpose and use, its scope, and agency roles in coordinated plan development. The health service area is described in terms of environment, economy, and population. Health status is assessed, based on specific health problems and trends, such as longevity; major causes of death, including cardiovascular disease and cancer, as well as others; family health indicators; and preventive health care. Consideration is given to health manpower, health settings, and the health system (e.g., premedical care, primary care, and secondary care). Health system components are analyzed, including promotion and protection (e.g., health education and environmental health), prevention and detection (immunization), ambulatory care, acute inpatient care, tertiary care, long-term care, and habilitation and rehabilitation. The AIP contains short-term goals and objectives relevant to health care in the community, ambulatory care, acute inpatient care, tertiary care, long-term care, and habilitation and rehabilitation.

HRP-0901830/0 PC A99/MF A01
South Plains Health Systems, Inc., Lubbock, TX.
Health Systems Plan and Annual Implementation Plan for 1979. Health Service Area 2 Texas.
1978, 624p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The health systems plan and the annual implementation plan of Texas' South Plains Health Systems, Inc., are presented. Remarks prefacing the plans concern the responsibility for health planning and the plan development process. Each plan is discussed. Following a description of the health service area, health concerns are evaluated. These are physical health status, such as cardiovascular disease, cancer, maternal and infant health, communicable disease, respiratory disease, arthritis, diabetes, vision, speech, language, hearing, dental health, allergies, and renal disease; mental health, such as alcohol and drug abuse, mental retardation, and mental illness; environmental health, such as water pollution, and sanitation; comprehensive issues, such as individual awareness and public education, information and referral, ambulatory care, and health care for the elderly population; and medical facilities, such as acute, ambulatory, and long-term care. Appendixes contain a glossary and further information on health resources and the goal- and priority-setting process.

HRP-0901831/8 PC A04/MF A01
Southwest Michigan Health Systems Agency, Inc., Kalamazoo.
Annual Implementation Plan for 1978-1979. Health Service Area 3 Michigan.
1978, 71p
See also HSP, HRP-0901832.

The introduction to the annual implementation plan (AIP) of the Southwest Michigan Health Systems Agency considers the link between the AIP and the health systems plan and notes the significant characteristics of health services (accessibility, availability, continuity, cost, and quality). The purposes and uses of the AIP are enumerated, and the AIP development process is described. Criteria for evaluating the AIP are noted, including appropriateness, effectiveness, efficiency, adequacy, and effort. AIP objectives, accompanied by recommended actions for their achievement, are listed in order of priority. These are the development of a comprehensive screening, referral, and treatment program for persons with symptoms of coronary heart disease; preparation of a progress report on the Michigan Blue Cross/Blue Shield prospective reimbursement program for hospitals; addition of a nutrition component to home health care services; expansion of formal health education programs; establishment of a women, infants, and children program; provision of family planning education services; establishment of a senior citizen counseling, crisis intervention, and referral service; implementation of a comprehensive school health education program; establishment of a 24-hour residential treatment center for adolescents; and the implementation of a model family planning outreach project.

HRP-0901832/6 PC A16/MF A01
Southwest Michigan Health Systems Agency, Inc., Kalamazoo.
Health Systems Plan for 1978-1979. Health Service Area 3 Michigan.
1978, 367p
See also AIP, HRP-0901831.

An executive summary of the health systems plan (HSP) prepared by the Southwest Michigan Health Systems Agency precedes the substantive portion of the plan. The preamble explores the legal basis for health planning, purpose and use of the HSP, functions of the health systems agency, and relationships between HSP implementation and other planning agencies and systems. The plan development process is detailed, with emphasis on the planning framework, the plan format, prioritization, evaluation, and State and Federal health priorities. A regional assessment of special needs and available resources is presented. Goals, objectives, and recommended actions are stipulated for health status (perinatal mortality, preventable communicable diseases, accidents, heart disease, cancer, cerebrovascular disease, respiratory dis-

ease, diabetes, mental illness, substance abuse, renal disorders, and dental disease) and for the health system. Components of the health system are health promotion and protection (health education and environmental quality); prevention and detection (screening); diagnosis and treatment (e.g., primary care physicians, dental manpower, medical-surgical use rates, adult medical-surgical occupancy, and obstetric beds); habilitation, rehabilitation, and maintenance (long-term care and home health care); and enabling services (per capita acute care hospital expenditures). Appendixes provide further information on the health planning process and health care needs.

HRP-0901852/4 PC **A22**/MF **A01**
West Alabama Health Council, Tuscaloosa.
Health Systems Plan for 1979-1983. Health Service Area 2 Alabama. 3rd Edition.
26 Apr 79, 505p
Grant PHS-04-P-000205-03-0
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also HRP-0901853, and HRP-0901854.

The West Alabama Health Council prepared this health systems plan (HSP). Introductory remarks focus on the legal structure of the health systems agency (HSA) and health planning, HSP purpose and scope, procedures for amending the HSP, and HSA project review criteria. A description of the health service area notes the physical characteristics of the region and demographic and socioeconomic characteristics of the population. Goals, objectives, recommended actions, and resource requirements are enumerated for health status and the health system. Health status is concerned with vital events and mortality (live birth rates, fertility rates, infant mortality rates, crude death rates, age-specific death rates, and leading causes of death by disease category); morbidity; functional disabilities such as mental illness and substance abuse; and the impact of the health system on health status. The health system includes health promotion and protection (e.g., air pollution, water supplies, occupational safety and health, and housing); prevention and detection (immunization and screening); medical care (ambulatory care, inpatient care, long-term inpatient care, home health care, emergency medical services, dental health, and clinical health maintenance); physical rehabilitation; mental health; and health system enabling services (planning, regulation, financing, and research). Further information on statewide health needs is appended, and references and a glossary are included.

HRP-0901853/2 PC **A03**/MF **A01**
West Alabama Health Council, Tuscaloosa.
Health Systems Plan for 1979-1983. Health Service Area 2 Alabama. Executive Summary.
26 Apr 79, 48p
Grant PHS-04-P-000205-03-0
See also HRP-0901852, and HRP-0901854.

Major provisions of the health systems plan (HSP) for residents served by the West Alabama Health Council are outlined in this executive summary. The introduction discusses the legal structure and functions of the health systems agency, the purpose and scope of the HSP, and the plan methodology. A description of the health service area is presented that notes demographic and socioeconomic characteristics of residents. Health status goals and objectives concern overall death rates, infant deaths, fetal deaths, mortality rates for leading causes of death (heart disease, stroke, cancer, accidents, diseases of the arteries, suicide, homicide, violent causes of death, and pneumonia and influenza), and communicable diseases (syphilis, gonorrhea, and tuberculosis). Health system goals and objectives relate to promotion and detection (environmental and occupational health, nutrition, health education, and high-level wellness); prevention and detection (immunization and screening); medical care (ambulatory care, inpatient care, home health care, emergency medical services, dental health, and clinical health maintenance); and physical rehabilitation (mental health and health system enabling services).

HRP-0901854/0 PC **A05**/MF **A01**
West Alabama Health Council, Tuscaloosa.
Annual Implementation Plan for 1979-1980. Health Service Area 2 Alabama.
1979, 80p
Grant PHS-04-P-000205-03-0
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also HRP-0901852, and HRP-0901853.

This annual implementation plan (AIP) was developed by the West Alabama Health Council. Introductory comments pertain to the relationship between the AIP and the health systems plan, priorities ranked in the AIP, and the purpose and scope of the AIP. Goals, objectives, and recommended actions to change the health system deal with health protection and promotion (environmental and occupational health, nutrition, health education, and high-level wellness); prevention and detection (immunization and screening); medical care (ambulatory care, inpatient care, home health care, emergency medical services, dental health, and clinical health maintenance); physical rehabilitation; and mental health. Appendixes provide information on alternative actions considered in AIP development, a summary of actions related to counties in the health service area (equipment, services, facilities, and manpower), and procedures to follow in a process evaluation of the AIP.

HRP-0901869/8 PC **A15**/MF **A01**
Permian Basin Health Systems Agency, Midland, TX.
Health Systems Plan for 1978-1979. Health Service Area 12 Texas.
18 May 78, 333p
See also AIP 1978-1979, HRP-0901870.

The health systems plan (HSP) developed by the Permian Basin Health Systems Agency in Midland, Tex., begins with an introductory section that explores the responsibility for health planning, the organizational structure for health planning, the purpose of the HSP, and an overview of HSP development. A description of the health service area notes geographic and demographic characteristics and provides an overview of health status and the health system. Goals and objectives are enumerated for physical health (maternal, perinatal, child, and adolescent care; emergency medical services; heart disease; cancer; communicable disease; renal disease; dental care; and rehabilitation), mental health (drug abuse, alcoholism, and mental retardation), environmental health, and special concerns (physician and other health manpower recruitment and cost containment). Recommendations pertinent to medical facilities are offered.

HRP-0901870/6 PC **A03**/MF **A01**
Permian Basin Health Systems Agency, Midland, TX.
Annual Implementation Plan for 1978-1979. Health Service Area 12 Texas.
1979, 46p
See also HSP 1978-1979, HRP-0901869.

The annual implementation plan (AIP) of the Permian Basin Health Systems Agency in Midland, Tex., explains desired changes relevant to the health system and the environment. The introduction covers the purpose and scope of the AIP, the AIP development process, and procedures for evaluating and amending the AIP. Short-range actions concern maternal, perinatal, child, and adolescent health; emergency medical services; heart disease; cancer; communicable disease; drug abuse; mental health; alcoholism; mental retardation; renal disease; dental care; rehabilition; and environmental health. Resource requirements to accomplish AIP objectives are noted, along with corresponding health systems plan goals and objectives.

HRP-0901873/0 PC **A25**/MF **A01**
Central California Health Systems Agency, Visalia.
Health Systems Plan for 1979-1985. Health Service Area 9 California. Volume 3.
1979, 598p
See also HSP Summary Volume 1, HRP-0901871, AIP 1979 Volume 2, HRP-0901872, and Compendium Volume 4, HRP-0901874.

Goals, objectives, and recommended actions are specified for salient issues regarding health status and the health system in this health systems plan (HSP) prepared by the Central California Health Systems Agency. The introduction to the HSP explores the legal basis of health planning, the structure of the health systems agency, the health care delivery system, and the HSP and the planning process. Priorities identified through the planning process are noted as they concern resource adjustment activities for general acute care services, long-term care system development, primary care, 24-hour mental health services, perinatal-neonatal care, health education and health promotion, cardiovascular surgery and catheterization services, and emergency medical services. Major sections of the HSP focus on health promotion and protection (health education), prevention and detection (primary care), diagnosis and treatment (general acute care services, special medical services, surgical services, diagnostic imaging, radiation therapy, emergency medical services, and mental health services), habilitation and rehabilitation, maintenance services, personal health care support services, and health system enabling services. A glossary is included.

HRP-0901976/1 PC **A99**/MF **A01**
Comprehensive Health Planning of Northwest Illinois, Inc., Rockford.
Health Systems Plan for 1979-1980. Health Service Area 1 Illinois. Second Edition.
17 Sep 79, 705p
Grant PHS-HRA-05-P-000236-04
See also AIP, HRP-0901977.

To meet the needs of residents it serves, Comprehensive Health Planning of Northwest Illinois devised this health systems plan (HSP). Following a summary of health status and health system goals, introductory comments focus on the statutory authority for health planning, the organization of the health systems agency, and the purpose and use of the HSP. The planning process and methodology are described. Demographic and socioeconomic characteristics of the health service area are assessed. Health status is evaluated with respect to mortality, cardiovascular disease, cancer, cerebrovascular disease, accidents, major causes of death, infant mortality and perinatal loss, abortions, morbidity, reportable diseases, developmental disabilities, mental illness, alcoholism, mobility status and activity limitations, chronic conditions, and life expectancy. Health system analysis covers community health promotion and protection, prevention and detection, diagnosis and treatment, habilitation and rehabilitation, maintenance such as end-stage renal disease services, personal health care support such as pharmacy services, and health system enabling services (planning, resource development, manpower, and financing).

HRP-0901989/4 PC **A22**/MF **A01**
Birmingham Regional Health Systems Agency, Inc., AL.
Health Systems Plan for 1979. Health Service Area 3 Alabama. 2nd Edition.
May 79, 515p
Grant PHS-HRA-04-P-000209-01-0
See also HRP-0901990.

Prefacing the health systems plan (HSP) of the Birmingham Regional Health Systems Agency, Inc., in Alabama is an introduction that focuses on the legal basis of health planning, the structure of the health systems agency, the purpose and scope of the HSP (national and statewide health priorities), the plan methodology, and implementation of the prior HSP and annual implementation plan. The health service area is described in terms of physical characteristics and demographic and socioeconomic indicators. Health status indicators are reviewed, including vital events and mortality, morbidity, functional disability, and behavioral health status. Health system analysis encompasses health protection and promotion (environmental health, nutrition, health education, and mental health), prevention and detection (immunization, health screening, dental prophylaxis, and mental health consultation), the medical care system (diagnosis and treatment relative to ambulatory care, inpatient care, home care, and health maintenance organizations), physical rehabilitation, and mental health care (substance abuse, mental illness, and developmental disabilities). An executive summary of the HSP, a glossary, and an index are provided.

HRP-0901990/2 PC **A06**/MF **A01**
Birmingham Regional Health Systems Agency, Inc., AL.
Annual Implementation Plan for 1979-1980. Health Service Area 3 Alabama.
1979, 111p

Grant PHS-HRA-04-P-000209-04-0
See also HRP-0901989.

The Birmingham Regional Health Systems Agency, Inc., in Alabama, formulated this annual implementation plan (AIP) to accomplish health status and health system goals and objectives. The purpose and scope of the AIP, the relation between the AIP and the health systems plan, and procedures for reviewing and amending the AIP are considered. The priority-setting process is described. Recommended actions are identified that concern environmental health and the water supply, nutrition, health education, health screening, primary care clinics and centers, emergency medical services, hospitals, home health care, drug abuse including alcoholism treatment, and community mental health centers. Costs to implement priority areas of the AIP are summarized, and the status of actions associated with the prior AIP is evaluated. An appendix lists health projects and hospital modernization, conversion, and construction projects for which a community's need has been established or for which need must be determined through review of the project.

HRP-0902007/4 PC **A09/MF A01**
Educational Testing Service, Princeton, NJ.
Health Plan Development: Concepts and Approaches for Board Members.
1979, 200p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational System - Self-Instruction Units.

These self-instructional units were conceived as an alternative or supplement to formal activities of health systems agency (HSA) boards in the conduct of community-based health planning, particularly health plan development. They represent a systems approach to health planning that incorporates five phases: main stages and responsibilities; assessment; goal/need analysis; action design; and plan selection. Units are appropriate for use by HSA governing bodies, committees, task forces, and staff members and by State agency and council members. After completion of the self-instructional activities, it is expected that users will be more informed policy and decisionmakers with respect to principal steps in plan development, interactions between HSA board and staff members, stages of assessment, the planning framework, indicators of health status and health system performance, data collection requirements and projections, the establishment of goals and priorities, long-range action proposals, and cost-effect factors in the selection of 'best' alternatives.

HRP-0902008/2 PC **A14/MF A01**
Educational Testing Service, Princeton, NJ.
A Course on Resource Development and Implementation.
1979, 320p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational System. Leader's Guide.

Instructional activities in this course on health systems agency (HSA) resource development and implementation (RDI) are practice-based and focus on individual agency needs and situations. Course goals are to assist HSA participants in developing agency policies and procedures needed to support the RDI function, to provide a framework for change through the utilization of agency and community resources, to develop and assess strategies for implementing agency health systems plans and annual implementation plans, to develop a management system that supports the activation and monitoring of RDI, to review and evaluate the RDI function, and to organize agency resources for the dissemination and utilization of RDI outcomes. End-stage renal disease is the primary theme of the course, and this topic serves as a unifying influence across program content and as a basis for various work activities. For each of six programs, the following materials are included: one-page summary; program description (goals, objectives, methods, materials, equipment, faculty requirements, suggestions for teaching, list of resource materials, evaluation strategies, time allocation, and summary of a pilot program evaluation); content outline; instructions for administering exercises; resource materials; and exercises.

HRP-0902009/0 PC **A07/MF A01**
Educational Testing Service, Princeton, NJ.
Forecasting for Health System Planning: Concepts and Approaches.
1979, 128p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational System. A Self-Instruction Unit.

The significant role of forecasting in the health planning process is addressed in this instructional unit. It is anticipated that users will be able to accomplish five objectives after completion of the unit: (1) explain functions of forecasting in health system planning; (2) name and define forecasting techniques, including extrapolation, curve-fitting, modeling, and the Delphi method; (3) follow a step-by-step guide for calculating statistical extrapolations; (4) describe criteria for the selection of a forecasting technique; and (5) evaluate common forecasting problems and their resolution. Intended for use by health systems agency plan development staff and committee members and by State health planning and development agencies, the course addresses basic concepts in and approaches to forecasting. Appendixes contain an exercise in extrapolation, an illustration of an input-output process flow model in health system planning, and suggestions for further reading and study.

HRP-0902010/8 PC **A10/MF A01**
Educational Testing Service, Princeton, NJ.
Cost-Effectiveness Analysis in Health System Planning.
1979, 211p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational System - A Self-Instruction Unit.

Concepts in cost-effectiveness analysis are outlined in this course to facilitate health system planning. Objectives of the instructional unit are to help health planners define cost-effectiveness analysis and health system planning, make a distinction between cost-effectiveness and other terms frequently used in the literature (cost-benefit and cost-utility), state reasons for the performance of cost-effectiveness analysis, calculate the cost-effectiveness of an alternative combination of long-range actions or a single action, identify what information is used in planning and the plan development phase from which information is obtained (assessment, goal/need analysis, action design), describe types of costs used in calculating effectiveness, note assumptions on which cost-effectiveness analysis is based, and describe common problems and strategies for their resolution. Sections of the unit pertain to such areas as alternative plans and techniques for refining cost-effectiveness analysis.

HRP-0902013/2 PC **A10/MF A01**
Education Testing Service, Princeton, NJ.
A Manual for Identifying Needs and Goals for Training in Health Resource Planning.
1979, 206p
Contract PHS-HRA-230-75-0064
Report on Health Resources Planning Educational System.

A 1975 functional task analysis of health planner duties resulted in the development of this manual on training needs and the establishment of priorities in health resource planning. The analysis considered tasks being performed by health planning agencies, what tasks are perceived by staff members as being the most frequent, task patterns (frequency and/or importance), what health planners perceive as requisite knowledge and skills in task performance, and the relation between required knowledge and skills and effective performance. Although manual content is appropriate for use in the employment setting and for the design of instructional programs, it is not relevant to personnel decisions about individuals. The primary purpose of the manual is to identify critical areas where training is needed and establish priorities among these needs. Attention is paid to professional staff competencies (knowledge, skills and abilities, and personal characteristics), the distinction between entry and advanced levels, performance requirements, and use of the manual (defining goals and objectives in terms of training needs and priorities). Additional information on the functional task analysis is appended, and the questionnaire is included.

HRP-0902021/5 PC **A21/MF A01**
West Central Illinois Health Systems Agency, Inc., Springfield.
Health Systems Plan for 1979. Health Service Area 3 Illinois. Second Edition.
Feb 79, 500p
Grant PHS-HRA-05-000245
See also Area Profile for 1979, HRP-0902022 and AIP 1979, HRP-0902023. Sponsored in part by Illinois State Dept. of Public Health, Springfield.

The health systems plan (HSP) of the West Central Illinois Health Systems Agency is presented. Following a summary of the plan, the introduction considers the statutory for health planning, policy statements of the health systems agency, responsibilities of the agency, and the scope and use of the HSP. The planning process and methodology are described, with reference to needs assessment, goal development and priority selection, development of objectives and potential long-range actions, and evaluation. Basic planning considerations are cited (national guidelines and priorities, statewide needs, and unique needs of area residents). Demographic and socioeconomic characteristics of the health service area are detailed. Health status is examined in relation to infant health, noncommunicable diseases (cardiovascular disease, chronic respiratory disease, cancer, diabetes, dental disease, hypertension, and cirrhosis of the liver), communicable diseases (preventable childhood diseases, venereal disease, and influenza-pneumonia), accidental deaths, homicide and suicide, and socioemotional disorders (mental illness, alcoholism, drug abuse, and developmental disabilities). The health system is evaluated with respect to health promotion and protection (consumer health education and health departments), prevention and detection (hypertension screening and family planning), diagnosis and treatment (primary care, mental health, emergency medical services, general medical services, obstetrical and neonatal care, pediatric care, surgical services, therapeutic radiology, and diagnostic radiology), maintenance (long-term care), habilitation and rehabilitation (home health care), support services (discharge planning), and enabling services (nurse practitioners). Priority goals and objectives and areas to be addressed in the future are noted.

HRP-0902022/3 PC **A16/MF A01**
West Central Illinois Health Systems Agency, Inc., Springfield.
Area Profile for 1979. Health Service Area 3 Illinois.
Apr 79, 369p
Grant PHS-HRA-05-000245
See also HSP 1979, HRP-0902021 and AIP 1979, HRP-0902023. Sponsored in part by Illinois State Dept. of Public Health, Springfield.

Statistical data characterizing the area served by the West Central Illinois Health Systems Agency are compiled in this profile. The area profile is intended to assist individuals and agencies concerned with health planning in the 18 counties served by the agency. The content and organization of the profile follow the mandate of the National Health Planning and Resources Development Act of 1974 (P.L. 93-641) that requires health systems agencies to collect and evaluate data on the health status of residents, the status of the health care delivery system, the effect of the health care delivery system on resident health, area health resources (including health services, manpower, and facilities), health resource utilization patterns, and environmental and occupational exposure factors affecting short-term and long-term health conditions. Data reflect population and socioeconomic characteristics, health status (natality, mortality, morbidity, and disability), health system resources, health system utilization, costs, and environmental-occupational factors (air pollution, smoking, fluoridation, sewer systems, refuse sites, food establishments, liquor sales, and coal miners receiving black lung benefits).

HRP-0902023/1 PC **A05/MF A01**
West Central Illinois Health Systems Agency, Inc., Springfield.
Annual Implementation Plan for 1979. Health Service Area 3 Illinois.
1979, 79p
Grant PHS-HRA-05-000245

See also HSP 1979, HRP-0902021 and Area Profile for 1979, HRP-0902022. Sponsored in part by Illinois State Dept. of Public Health, Springfield.

The West Central Illinois Health Systems Agency prepared this annual implementation plan (AIP). Introductory comments pertain to the statutory authority for health planning and functions of the health systems agency. The purpose and scope of the AIP are described, and the planning methodology is discussed (development of short-range objectives and actions, public review and dissemination, prioritization of objectives, and evaluation). Objectives and short-range actions are indicated for health promotion and detection (health education and health departments), prevention and detection (hypertension screening and family planning), and diagnosis and treatment (primary care, alcoholism, emergency medical services, general bed supply, obstetrical and neonatal services, and computed tomographic scanners). Objectives are ranked in order of priority. An appendix provides information on public involvement, coordination, and establishment of the AIP. A glossary and a list of acronyms are included.

HRP-0902027/2 PC **A99**/MF **A01**
Western Colorado Health Systems Agency, Grand Junction.
Health Systems Plan for 1979-1984. Health Service Area 3 Colorado. 2nd Edition.
13 Dec 78, 714p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also HRP-0902028.

Desired health-related accomplishments are indicated in the health systems plan of the Western Colorado Health Systems Agency. Three major thrusts of the plan, condensed from 14 goals and 24 long-range objectives, are health promotion and disease prevention; increased availability and accessibility of services; and promotion of a regionalized health care system that provides an optimum tradeoff among availability, cost, quality, and acceptability of services. A description of the health service area and the health systems agency is presented. Strategies for implementing goals and long-range objectives are outlined for five components: (1) health status--effects of smoking on health and planning for the promotion of independent living through alternatives to institutionalization; (2) preprimary care--health promotion and protection, personal responsibility for health, and school health education; (3) primary care--planning for the organization, financing, and delivery of public health services; (4) secondary care--general acute adult inpatient medical/surgical services, acute inpatient psychiatric services, acute inpatient pediatric care, and inpatient long-term care; and (5) tertiary care--burn care, blood banking and processing, and heart catheterization/angiographic services. The HSP also addresses the health status of infants and mothers, community-based mental health services, reducing cardiovascular disease in adults between 45 years and 64 years of age, primary care in medically underserved areas, and the effect of alcohol on health.

HRP-0902028/0 PC **A11**/MF **A01**
Western Colorado Health Systems Agency, Grand Junction.
Annual Implementation Plan for 1978-1979. Health Service Area 3 Colorado.
10 May 78, 229p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. See also HRP-0902027.

The annual implementation plan (AIP) adopted by the Western Colorado Health Systems Agency opens with an introductory section that defines major areas of concern. Five areas are detailed: (1) disease prevention--school health education, personal health habits, immunizations, and environmental factors; (2) public health; (3) alternatives to institutional care--hospitals and long-term care; (4) inpatient psychiatric care; and (5) third-party reimbursement policies and practices. Short-range objectives are specified, and potential barriers to the achievement of objectives are identified. The role of the community in illness prevention and the impact of implementation activities are considered. Appendixes contain information on the authority and responsibility for plan implementation, the plan implementation process, the selection of long-range objectives for inclusion in the AIP, short-range objectives and the relation between the health systems plan and the AIP, resource requirements to implement short-range objectives, the AIP work program, evaluation, public involvement, and review. An index to materials for Federal requirements is provided.

HRP-0902029/8 PC **A20**/MF **A01**
Health Systems Agency, Gadsden, AL.
Health Systems Plan for 1979-1984. Health Service Area 4 Alabama. Volume 1. Second Edition.
8 Jan 79, 472p
Contract PHS-HRA-04-000210
See also HSP Volume 2, HRP-0902030; HSP Executive Summary, HRP-0902031; and AIP 1979-80, HRP-0902032.

Improvement in health status and the health system is the overall purpose of the health systems plan (HSP) devised by the health systems agency in Alabama Health Service Area IV. The introductory section discusses the legal sanction for health planning, the structure of the health systems agency, the purpose and scope of the HSP (local, State, and national health priorities), the plan methodology, and national health planning guidelines. Physical, demographic, and socioeconomic characteristics of the health service area are described. Health status analysis is concerned with vital events/mortality, morbidity, and functional disability. The health system is examined in terms of health promotion and protection (environmental quality, nutrition, and health education), prevention and detection (immunization and health screening), medical care (ambulatory, inpatient, and home care and health maintenance organizations), physical rehabilitation, and mental health (substance abuse, mental illness, and developmental disabilities). Goals, objectives, recommended actions, required resources, and responsible agencies associated with health status and the health system are identified.

HRP-0902031/4 PC **A03**/MF **A01**
Health Systems Agency, Gadsden, AL.
Health Systems Plan for 1979-1984. Health Service Area 4 Alabama. Executive Summary.
1 Sep 79, 42p
Contract PHS-HRA-04-000210
See also HSP Volume 1, HRP-0902029; HSP Volume 2, HRP-0902030; AIP 1979-1980, HRP-0902032.

An executive summary of the health systems plan (HSP) for residents served by the health systems agency in Alabama Health Service Area IV is presented. Introductory comments address the National Health Planning and Resources Development Act of 1974 (P.L. 93-641), responsibilities of the health systems agency, ways of achieving health planning objectives (improve the health of residents; increase the availability, accessibility, acceptability, continuity, and quality of health services; restrain health care costs; and prevent duplication of health resources), the purpose and scope of the HSP, the plan methodology, community involvement in plan development activities, and health status-health system standards. Emphasis is placed on births, fertility, infant mortality, maternal mortality, crude death rates, accidental deaths, death rates for specific disease types, hypertension, cancer, gonorrhea and syphilis, tuberculosis, developmental disabilities, mental retardation, cerebral palsy, epilepsy, autism, air quality, water quality, nutrition, health education, immunization, screening, primary care, emergency care, free-standing support, hospitals, nursing homes, home health care, health maintenance organizations, physical rehabilitation, and mental health. Goals, objectives, and recommendations pertinent to the preceding areas are enumerated.

HRP-0902032/2 PC **A05**/MF **A01**
Health Systems Agency, Gadsden, AL.
Annual Implementation Plan for 1979-1980. Health Service Area 4 Alabama.
1979, 79p
Contract PHS-HRA-04-000210
See also HSP Volume 1, HRP-0902029; HSP Volume 2, HRP-0902030; and HSP Executive Summary, HRP-0902031.

The health systems agency for Alabama Health Service Area IV developed this annual implementation plan (AIP). The introductory section deals with the legal sanction for health planning and the structure of the health systems agency, the purpose of the AIP, the relation between the health systems plan and the AIP, and the plan methodology (planning framework, the plan development process, the timeframe of the AIP, and the implementation strategy). Objectives of the AIP concern public water, screening, health education, hospital occupancy, emergency medical services, hospital renovation, nursing home bed supply, fluoridation, primary care clinics, hypertension screening, nursing home occupancy, mental health, physical rehabilitation, inpatient pediatric units, primary care, hospital bed supply, maternal and child health, health maintenance organization feasibility, developmental disabilities, home health care, district health departments, rabies control, hospital outpatient services, and mental health funding. A priority ranking of these objectives is provided.

HRP-0902038/9 PC **A02**/MF **A01**
Montgomery County Dept. of Health Systems Planning, Rockville, MD.
Health Systems Plan for 1979-1983. Health Service Area 2 Maryland. Summary.
1979, 18p
Contract PHS-HRA-03-P-00142-0
See also HSP 1979-1983, HRP-0902039 and AIP 1979-1980, HRP-0902040.

A summary of the health systems plan (HSP) for Montgomery County, Md., is provided. Introductory comments address the legislative mandate of the National Health Planning and Resources Development Act of 1974 (P.L. 93-641) to provide effective health planning and to guide health resource development, functions of the health systems agency, the HSP development process, the annual implementation plan as a community action plan to implement goals of the HSP on a short-term basis, national health planning guidelines, and the regional health planning process. A profile of the planning area is presented that notes priority population groups. Plan content focuses on goals, objectives, and recommended actions for health status (nutrition, alcoholism, hypertension, and motor vehicle accidents) and the health system (community health promotion and protection, prevention and detection, diagnosis and treatment, mental health, maintenance, long-term care), health system enabling services, and necessary health system changes.

HRP-0902039/7 PC **A99**/MF **A01**
Montgomery County Dept. of Health Systems Planning, Rockville, MD.
Health Systems Plan for 1979-1983. Health Service Area 2 Maryland. 2nd Edition.
19 Jun 79, 649p
Contract PHS-HRA-03-P-00142-0
See also HSP 1979-1983 Summary, HRP-0902038, and AIP 1979-1980, HRP-0902040.

Following a summary of the health systems plan (HSP) for Montgomery County, Md., the introductory section discusses the authority and legal basis for health planning, the purpose and use of the HSP, the health planning process, and the scope of the HSP. A community profile is presented that describes geographic, demographic, and socioeconomic characteristics of health service area residents. Health status is assessed with respect to mortality, morbidity, and high-priority concerns (deaths and disabilities resulting from motor vehicle accidents, hypertension, alcoholism, nutrition, and high-risk population groups--elderly, poor and medically indigent, and mentally/physically handicapped). Health system analysis encompasses community health promotion and protection (health education and environmental health--air quality, water/liquid waste, solid waste and sludge, noise, and occupational health), prevention and detection, diagnosis and treatment (primary care, acute care, pediatrics, and medical-surgical care), diagnostic radiology, therapeutic radiology, cardiac surgery/cardiac catheterization, emergency medical services, mental health, long-term care, hospices, and renal dialysis, and health system enabling services. Necessary health system changes and HSP evaluation are examined.

HRP-0902040/5 PC **A05**/MF **A01**
Montgomery County Dept. of Health Systems Planning, Rockville, MD.

Annual Implementation Plan for 1979-1980. Health Service Area 2 Maryland.
19 Jun 79, 91p
Contract PHS-HRA-03-P-00142-0
See also HSP 1979-1983, HRP-0902039, and HSP-1979-1983 Summary, HRP-0902038.

This annual implementation plan (AIP) contains short-range objectives selected from the health systems plan prepared by the Montgomery County, Md., Department of Health Systems Planning. Introductory remarks prefacing the main body of the AIP concern the legal basis of health planning, the purpose and content of the AIP, and the health planning process. Priority health status problems are identified (alcoholism, hypertension, nutrition, and deaths and disabilities resulting from motor vehicle accidents). Priority health system problems are then listed, prevention and detection, primary care, mental health (planning, acute inpatient care, and aftercare), long-term care, emergency medical services, renal dialysis, medical and surgical services, diagnostic radiology, radiation therapy, pediatrics, obstetrics, and cardiac surgery-catheterization. Goals, objectives, recommended actions, and resource requirements are indicated for health status and health system problems.

HRP-0902067/8 PC **A08**/MF **A01**
American Occupational Therapy Association, Inc., Rockville, MD.
Development of Self-Assessment Instruments and a Competency Assurance System for Occupational Therapy Practitioners.
Comprehensive rept. 1 Oct 77-30 Jun 79, Madelaine S. Gray, and Ellen Stern. 1 Oct 79, 170p
Contract PHS-HRA-231-77-0102

In October 1977 the American Occupational Therapy Association (AOTA) began work on an 19-month contract, funded by the Division of Associated Health Professions, to further develop a comprehensive system to assure the competency of occupational therapy practitioners. The three objectives of the project were--(1) To design a competency assurance system for the field of occupational therapy. (2) To develop self-assessment tools to enable occupational therapists and occupational therapy assistants to identify their areas of knowledge and skill and learning needs in relation to the practice of occupational therapy. (3) To develop study packages to assist occupational therapy practitioners in identifying continuing education resources relevant to their learning needs.

HRP-0902084/3 PC **A03**/MF **A01**
Health Resources Administration, Hyattsville, MD.
The Use of Nominal Group Process as a Planning Tool. Student Manual.
1979, 35p

This session focuses on the following aspects of a planning process: information gathering, problem identification, problem analysis, problem solving, and the organization of potential solutions into project objectives. The intention is to emphasize the importance of activities that are most frequently overlooked in planning: pinpointing the problem, understanding why the problem exists, and recognizing that numerous alternative solutions are potentially acceptable. The module introduces participants to the Nominal Group Process as a potentially useful problem-oriented planning tool. The final part of the session is devoted to the development of specific objectives that become part of a program plan and the funding application. These are the ultimate outputs of the Nominal Group Process and a crucial stage of the total planning process.

HRP-0902085/0 PC **A03**/MF **A01**
Health Resources Administration, Hyattsville, MD.
Sources of Funding. Student Manual.
1979, 41p

There has been in the recent past and will continue to be in the foreseeable future considerable federal and foundation support for developing emergency medical services systems. It is essential for administrators to know what funding sources are available, for what aspect of system development, and also how to tap these sources. Outside funding sources will not last forever and it is necessary to plan for eventual self-sufficiency. To do this administrators must understand what local monies are available and prepare to capture them for the long-term maintenance of the system. There are two solutions: one is that the user pays for services; the other is that local government assumes responsibility for emergency care financing. There is, of course, the combination of both methods. In this session, all sources of EMS funding are reviewed, as are the issues involved in determining on-going system support.

HRP-0902086/8 MF **A01**
Health Resources Administration, Hyattsville, MD.
EMS Cost Analysis - Student Manual.
1979, 32p
Available microfiche only because of poor quality.

The following unit will prepare administrators for more realistic financial planning by presenting: (1) the relative costs of different organizational models, (2) a means of identifying costs, (3) sources of information about costs, and (4) ways of reducing costs. Cost considerations should not wholly govern EMS system development. For example, a shared central dispatch may be politically unfeasible, and fire rescue may provide higher quality care than other staffing alternatives. However, there can be no responsible decision-making process divorced from a knowledge and understanding of cost.

HRP-0902087/6 PC **A02**/MF **A01**
Health Resources Administration, Hyattsville, MD.
EMS Systems Planning - Student Manual.
1979, 25p

This unit proposes a planning process which involves the understanding of current needs and resources, the generation of explicit goals and objectives, and the positing of alternative routes to achieve those objectives. Environmental factors which impact significantly on the planning process are acknowledged and the tools that support the process are introduced. A major portion of the session covers the object of the planning process: an EMS system which will lead to better patient care. Numerous ways of conceptualizing the system are presented.

HRP-0902088/4 MF **A01**
Health Resources Administration, Hyattsville, MD.
Regionalization - Student Manual.
1979, 20p
Available microfiche only because of poor quality.

The purpose of this module is to introduce to EMS administrators the concept of regionalization - that is the coordination and integration of all EMS subsystem components with the intent to improve health care delivery. Important to note is the fact that regionalization of one subsystem in isolation from other components will not yield a regional system response in an emergency situation. Central to the regionalizing effort of the federal government, outlined in PL 93-154, is the categorization of hospital emergency facilities. This module concentrates on the issue of categorization as it relates to system regionalization. The concept of and approaches to categorization are discussed and a general implementation procedure is summarized. In devising a regionalization strategy administrators and planners should be directed toward consolidating communities to insure adequate emergency service coverage. To this end the need to formalize mutual aid agreements with other systems is emphasized.

HRP-0902089/2 MF **A01**
Health Resources Administration, Hyattsville, MD.
EMS System Evaluation - Student Manual.
1979, 19p
Available microfiche only because of poor quality.

Evaluation is an essential part of any health care delivery system and consists primarily of measuring the system's success in meeting its stated goals and objectives. Ultimately this entails the actual measurement of patient-outcome data (the change in mortality and morbidity). As yet, sophisticated methodologies to measure outcome have not been developed. At the present level of experience, other less complex evaluation opportunities do exist and should be pursued aggressively by the EMS administrator. This unit introduces some of these opportunities and details approaches for their utilization in system assessment.

HRP-0902090/0 PC **A02**/MF **A01**
Health Resources Administration, Hyattsville, MD.
Pre-Hospital Personnel - Student Manual.
1979, 14p

Ten years ago on-scene care of the critically injured was minimal with emphasis primarily on rapid transport. By the 1970's improved on-scene care was expected by both health-care consumers and providers and major changes emphasizing better training and continuing education on the part of pre-hospital EMS personnel have resulted. This module is directed towards an examination of the different pre-hospital EMS training curricula in use today. The role and authority of the dispatcher will be discussed as will methods of evaluation and budgeting of several pre-hospital personnel training courses.

HRP-0902091/8 PC **A03**/MF **A01**
Health Resources Administration, Hyattsville, MD.
Constructing Questionnaires for Program Evaluation -Student Manual.
1979, 33p

EMS Administrators may sometimes determine a need to go beyond the evaluative requirements of the federal government in order to assess the impact of special programs which they have initiated. To facilitate the evaluation of a program or service, questionnaires are employed to ferret out the desired information. The primary objective of this session is to introduce to the EMS administrator the questionnaire and to demonstrate the method by which they are constructed. In this session the importance of stating objectives clearly is underscored and the criteria for formulating sound questions are outlined. Sample EMS questionnaires have been selected for analysis by the instructor and the participants.

HRP-0902092/6 PC **A02**/MF **A01**
Health Resources Administration, Hyattsville, MD.
EMS Management - Student Manual.
1979, 11p

The goal of the Emergency Medical System Act (P.L. 93-154) was, 'to develop systems of emergency medical care that would significantly decrease current health and disability rates.' To achieve this goal, strategies have been developed by federal, state and local agencies to initiate programs that would integrate the fifteen mandatory components into the existing medical system in order to meet the medical needs of all emergency patients. Many federal, state and local agencies and institutions and several foundations are presently providing funds to organize the delivery of emergency medical services into a regionalized system. The administrative structures associated with managing an EMS system is likely to vary depending upon the programs each system undertakes, the amount of financial support available, and the amount of centralization of activity within each system. It is the intent of this module to identify the major funding agencies for EMS systems, describe the legislated authority and illucidate the major issues that surround EMS management.

HRP-0902093/4 PC **A06**/MF **A01**
Health Resources Administration, Hyattsville, MD.
Project Evaluation -Instructor's Manual.
1979, 116p

As a prerequisite for this module, it is recommended that the participants first complete the module entitled 'EMS Evaluation.' In this module a review and analysis of the tested methodologies in the evaluation of EMT training and performance, critical care compliance and patient outcome measures are discussed and analyzed. In this unit, the student will be required to participate in the analysis of these methodologies and the actual construction of similar study methods will comprise a large portion of the course content.

HRP-0902094/2 PC **A03**/MF **A01**
Health Resources Administration, Hyattsville, MD.
The Use of Nominal Group Process as a Planning Tool - Instructor's Manual.
1979, 38p

The session focuses on the following aspects of a planning process: information gathering, problem identification, problem analysis, problem solving, and the organization of potential solutions into project objectives. The intention is to emphasize the importance of activities that are most frequently overlooked in planning: pinpointing the problem, understanding why the problem exists, and recognizing that numerous alternative solutions are potentially acceptable. The module introduces participants to the Nominal Group Process as a potentially useful problem-oriented planning tool. The final part of the session is devoted to the development of specific objectives that become part of a program plan and the funding application. These are the ultimate outputs of the Nominal Group Process and a crucial stage of the total planning process.

HRP-0902096/7 PC **A03**/MF **A01**
Health Resources Administration, Hyattsville, MD.
EMS Cost Analysis - Instructor's Manual.
1979, 34p

The following unit will prepare administrators for more realistic financial planning by presenting: (1) the relative costs of different organizational models, (2) a means of identifying costs, (3) sources of information about costs, and (4) ways of reducing costs. Cost considerations should not wholly govern EMS system development. For example, a shared central dispatch may be politically unfeasible, and fire rescue may provide higher quality care than other staffing alternatives. However, there can be no responsible decision-making process divorced from a knowledge and understanding of cost.

HRP-0902097/5 PC **A03**/MF **A01**
Health Resources Administration, Hyattsville, MD.
EMS Systems Planning -Instructor's Manual.
1979, 28p

This unit proposes a planning process which involves the understanding of current needs and resources, the generation of explicit goals and objectives, and the positing of alternative routes to achieve those objectives. Environmental factors which impact significantly on the planning process are acknowledged and the tools that support the process are introduced. A major portion of the session covers the object of the planning process: an EMS system which will lead to better patient care. Numerous ways of conceptualizing the system are presented.

HRP-0902098/3 PC **A02**/MF **A01**
Health Resources Administration, Hyattsville, MD.
Regionalization - Instructor's Manual.
1979, 23p

The purpose of this module is to introduce to EMS administrators the concept of regionalization - that is the coordination and integration of all EMS subsystem components with the intent to improve health care delivery. Important to note is the fact that regionalization of one subsystem in isolation from other components will not yield a regional system response in an emergency situation. Central to the regionalizing effort of the federal government, outlined in PL 93-154, is the categorization of hospital emergency facilities. This module concentrates on the issue of categorization as it relates to system regionalization. The concept of and approaches to categorization are discussed and a general implementation procedure is summarized. In devising a regionalization strategy administrators and planners should be directed toward consolidating communities to insure adequate emergency service coverage. To this end the need to formalize mutual aid agreements with other systems is emphasized.

HRP-0902099/1 PC **A02**/MF **A01**
Health Resources Administration, Hyattsville, MD.
EMS System Evaluation - Instructor's Manual.
1979, 22p

Evaluation is an essential part of any health care delivery system and consists primarily of measuring the system's success in meeting its stated goals and objectives. Ultimately this entails the actual measurement of patient-outcome data (the change in mortality and morbidity). As yet, sophisticated methodologies to measure outcome have not been developed. At the present level of experience, other less complex evaluation opportunities do exist and should be pursued aggressively by the EMS administrator. This unit introduces some of these opportunities and details approaches for their utilization in system assessment.

HRP-0902100/7 PC **A03**/MF **A01**
Health Resources Administration, Hyattsville, MD.
Basic Statistical Concepts - Instructor's Guide.
1979, 38p

The module that follows is provided to increase the knowledge and skills of incumbent EMS administrators with its focus on one particular aspect of EMS systems. In the section entitled 'Scope,' a description of the module's topical area is presented and states what is covered and why it is important. Instructional objectives are offered which you can utilize to aid in your organization of the material. The outline, exercises, bibliographies, and appendices are intended as a guide which offers methods for demonstrating the topics relevant to the module. The questionnaires can be used by you for evaluating the performance of the trainee after the course is completed.

HRP-0902101/5 PC **A02**/MF **A01**
Health Resources Administration, Hyattsville, MD.
Pre-Hospital Personnel - Instructor's Manual.
1979, 17p

The module that follows is provided to increase the knowledge and skills of incumbent EMS administrators with its focus on one particular aspect of EMS systems. In the section entitled 'Scope,' a description of the module's topical area is presented and states what is covered and why it is important. Instructional objectives are offered which you can utilize to aid in your organization of the material. The outline, exercises, bibliographies, and appendices are intended as a guide which offers methods for demonstrating the topics relevant to the module. The questionnaires can be used by you for evaluating the performance of the trainee after the course is completed.

HRP-0902102/3 PC **A03**/MF **A01**
Health Resources Administration, Washington, DC.
Constructing Questionnaires for Program Evaluation - Instructor's Manual.
1979, 36p

EMS Administrators may sometimes determine a need to go beyond the evaluative requirements of the federal government in order to assess the impact of the federal government in order to assess the impact of special programs which they have initiated. To facilitate the evaluation of a program or service, questionnaires are employed to ferret out the desired information. The primary objective of this session is to introduce to the EMS administrator the questionnaire and to demonstrate the method by which they are constructed. In this session the importance of stating objectives clearly is underscored and the criteria for formulating sound questions are outlined. Sample EMS questionnaires have been selected for analysis by the instructor and the participants.

HRP-0902103/1 PC **A02**/MF **A01**
Health Resources Administration, Hyattsville, MD.
EMS Management - Instructor's Manual.
1979, 14p

Many federal, state and local agencies and institutions and several foundations are presently providing funds to organize the delivery of emergency medical services into a regionalized system. The administrative structures associated with managing an EMS system is likely to vary depending upon the programs each system undertakes, the amount of financial support available, and the amount of centralization of activity within each system. It is the intent of this module to identify the major funding agencies for EMS systems, describe the legislated authority and illucidate the major issues that surround EMS management.

HRP-0902106/4 MF **A01**
Health Resources Administration, Hyattsville, MD.
Basic Statistical Concepts - Student's Guide.
1979, 25p
Available microfiche only because of poor quality.

The use of statistical techniques is rapidly increasing in research and evaluation for all medical fields. Therefore, it is increasingly important that the underlying concepts of statistical analysis be well understood by anyone reading the literature, planning and executing studies to evaluate existing programs or assessing the impact of planned innovations. The aim of this unit is to briefly survey some of the important concepts central to statistical analysis.

HRP-0902107/2 PC **A05**/MF **A01**
Young (Arthur) and Co., Washington, DC.
Sources of Data Related to Dentistry: A Catalog.
Apr 80, 96p DHEW/PUB/HRA-80-7
Contract PHS-HRA-231-77-0087

The catalog is designed to provide a data access tool to meet the needs of health planners, researchers, and administrators who are involved in dental care delivery planning. The data sources described have the limitation of application on a nationwide basis as opposed to specific State or regional compilations. The catalog is organized according to subject areas which represent aspects of dental health planning. Each source is categorized according to the primary emphasis of its data content. Because many data sources contain data on more than one subject area, the last page of many sections contains cross-references to data sources described under other subject areas which also contain data relevant to the particular (secondary) subject area. The data source sheets, organized one per data source, contain descriptions of the data attributes which are intended to aid the catalog user in determining the applicability of the sources to their data requirements, as well as the source availability. The catalog is intended to serve the needs of dental planning problem investigators in evaluating the usefulness of particular sources for their particular analysis needs. Information for detailed data usage (e.g., variable codes, research methodology) can be obtained from the organization/person responsible for developing the data. The last item on each source describes how the data may be obtained (possibly included in resulting secondary sources) and restrictions on its use. All data available from any agency of the Federal Government are subject to the restrictions imposed by the Privacy Act of 1974. If there are any additional restrictions, these should be noted.

HRP-0902111/4 PC **A17**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Manpower Requirements in Eight Surgical Specialties (1990).
Comprehensive rept. 26 Apr 79-26 Feb 80,
John Wills. Feb 80, 382p
Contract PHS-HRA-232-79-0032

The report presents the estimates obtained by applying the Graduate Medical Education National Advisory Committee's 'adjusted needs-based' manpower requirements model to eight surgical specialties: general surgery, neurosurgery, ophthalmology, orthopedic surgery, otolaryngology, plastic surgery, thoracic surgery, and urology. The estimates were derived from Delphi panel sessions of physicians and other health care professionals. In addition to a general description of the model and the estimation process, the report covers in detail for each of these specialties: (1) any necessary modifications of the general model structure, (2) Delphi-panel estimates of each of the components of the model, and (3) the implied surgical manpower requirements for 1990. The calculation of estimated manpower requirements is documented in detail. The reported estimates of the components of the model, which are the determinants of manpower requirements, include disease- and procedure-specific estimates of the needs for care and norms for care for each of the specialties, as well as estimates of each specialty's productivity. Cross-specialty comparisons are made for particular parameters of the model. Limitations of the model are identified, and potential refinements or improvements in the model are recommended.

HRP-0902112/2 PC **A03**/MF **A01**
Health Resources Administration, Hyattsville, MD. Office of Graduate Medical Education.

Characteristics of General Internists and the Content of Care of Their Practices.
Barbara A. Feller. 1979, 43p DHEW/PUB/HRA-79-652

Data on characteristics of general internists and their practices and on characteristics of their patients, diagnoses, and care are presented in this report. Findings regarding the distribution of internists by practice arrangement and the location of practitioners by region and metropolitan/non-metropolitan status are described. Physician productivity, as measured by patient volume and professional activity, is explored. Information is provided regarding the most frequently encountered principal diagnoses and about the diagnostic tests and therapeutic procedures most frequently used by general internists.

HRP-0902129/6 PC **A99**/MF **A01**
Chicago Health Systems Agency, IL.
Health Systems Plan for 1979. Health Service Area 6 Illinois. Second Edition.
1979, 663p
Grant PHS-05-P-000228-03
See also HSP 1979 Appendices, HRP-0902131.

The document is the Health Systems Plan (HSP) for the City of Chicago (Illinois Health Service Area 6) prepared by the City of Chicago Health Systems Agency (CHSA). The HSP represents the first step toward proposing changes in the health system which should result in the improved health status of Chicago residents, promote a healthful environment and provide for the availability and accessibility of high quality health services in a manner which fosters continuity of care at a reasonable cost. Chicago's vast array of health resources serve City residents as well as persons from areas outside the City. The identification and analysis of the City's health needs and available resources and services is a major undertaking requiring more than a single year of effort. Because the HSP will be updated annually, more in-depth information about the elements of the system and the needs of the people will be documented in future years. The purpose of the HSP is to serve as a guide as to how the health system will change over time and to communicate the health needs of Chicago residents and the condition of the health system.

HRP-0902130/4 PC **A06**/MF **A01**
Chicago Health Systems Agency, IL.
Annual Implementation Plan for 1979. Health Service Area 6 Illinois.
1979, 116p
Grant PHS-05-P-000228-03
See also HSP 1979, HRP-0902129.

The Annual Implementation Plan (AIP), developed from the Health Systems Plan, (HSP), implements the National Health Planning and Resources Development Act of 1974 (P.L. 93-641). This Act, administered by the U.S. Department of Health, Education and Welfare (DHEW), authorized the establishment of a network of areawide and state health planning agencies. The areawide planning agencies are called Health Systems Agencies (HSAs), which may be non-profit corporations, regional planning bodies, or units of local government. The DHEW issued regulations and guidelines for compliance, and the National Council on Health Planning and Development was organized as an advisory group. State health planning and development agencies (SHPDAs) were established to meet the needs of consumers and providers of health services throughout the nation. Agreements were made with each state to designate a SHPDA. On September 11, 1975, the Illinois Legislature passed the Comprehensive Health Planning Act (P.A. 79-939) authorizing the establishment of the SHPDA and the Statewide Health Coordinating Council (SHCC) as an advisory group with a majority of consumer representatives. All members of the SHCC are appointed by the Governor, with 60 percent selected from nominees of area HSAs and the remaining 40 percent at-large appointments. The Illinois Department of Public Health (IDPH) was designated as the SHPDA for Illinois. Eleven HSAs were authorized by DHEW for designation in the State of Illinois.

HRP-0902131/2 PC **A12**/MF **A01**
Chicago Health Systems Agency, IL.
Health Systems Plan for 1979. Health Service Area 6 Illinois - Appendixes.
1979, 259p
See also AIP 1979 (2nd Edition), HRP-0902130.

A questionnaire concerning health facilities, manpower and services in the City of Chicago was mailed to 3,119 organizations. The recipients of these questionnaires included community organizations, churches, government sponsored organizations and aldermen. The purpose of the questionnaire was to provide the HSA with some indication of how community organizations perceive the adequacy of existing health facilities, manpower and services; and, additionally to determine what these organizations feel to be the major health needs of the communities they serve.

HRP-0902132/0 PC **A24**/MF **A01**
East Central Illinois Health Systems Agency, Champaign.
Health Systems Plan for 1979. Health Service Area 4 Illinois.
Nov 78, 574p
Grant PHS-05-P-000208-02
See also AIP 1979, HRP-0902133.

The National Health Planning and Resources Development Act of 1974 has introduced a new responsibility for health planning at the local level. Under the Act the East Central Illinois Health Systems Agency (ECIHSA) has responsibility for planning for the health of the population and the health care system of Area IV. Included in the mandates of the Act is the drafting of a Health Systems Plan. This document, the Health Systems Plan for East Central Illinois, is a statement by the ECIHSA regarding the achievement and maintenance of a desired level of health status for the residents of Area IV and the desired performance of the health care system. In addition, the Health Systems Plan provides a basis for the ECIHSA to perform certain of its functions, such as promoting a healthful environment, reviewing proposed changes in the health-care system, reducing documented deficiencies and inefficiencies in the health-care system, and promoting desired changes which meet the identified health needs of the community. The Health Systems Plan provides area residents and the health service community an effective guide for planning, organizing, and communicating the changes suggested herein.

HRP-0902133/8 PC **A04**/MF **A01**
East Central Illinois Health Systems Agency, Champaign.
Annual Implementation Plan for 1979. Health Service Area 4 Illinois.
1979, 65p
Grant PHS-05-P-000208-02
See also HSP 1979, HRP-0902132.

The Annual Implementation Plan provides a basis for the ECIHSA to perform certain of its functions, such as promoting a healthful environment, reviewing proposed changes in the health-care system, reducing documented deficiencies and inefficiencies in the health-care system, and promoting desired changes which meet the identified health needs of the community. The Annual Implementation Plan should provide to area residents and to the health community an effective guide for planning, organizing and communicating to effect the changes suggested herein.

HRP-0902149/4 PC **A03**/MF **A01**
Pennsylvania Univ., Philadelphia. Emergency Medical Services.
Mobilizing Public Support and Participation: Student Manual,
C. Gene Cayten. 1979, 46p
Contract PHS-HRA-231-75-0601

The development of an EMS system depends upon many individuals whose primary concern is not the EMS system. This group includes legislators, government officials, public safety agency officials, telephone company officials, school officials, media people, hospital administrators, as well as the providers, the physicians, nurses and paraprofessionals. They must be motivated to work cooperatively and productively in a venture that threatens their independence or, at a minimum, forces them to take a stand. If they are not mobilized, if their power is not used in behalf of the developing system, no system can be developed. The general public needs to be mobilized as well as the power people and, in fact, an enthusiastic public becomes an important tool in motivating power people. This session identifies which people are key for which system needs and analyzes various means of involving them to aid in system development. Equal time is given to mobilizing the general public who, in turn, become an important lobbying force.

HRP-0902173/4 PC **A02**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
Reviews of Proposed Uses of Federal Funds Involving Multiple Health Systems Agencies.
Apr 80, 21p
Contract PHS-HRA-232-79-0036

Under provisions of Title XV of the Public Health Service Act, health systems agencies (HSAs) are required to review certain proposed uses of Federal funds in their health service areas. Many Federal projects impact on more than one health service area. In such cases, the use in each area is subject to review. A mechanism for coordinated review of such multi-area projects is necessary, and final Rules governing the program establish minimum requirements for such reviews. This document explores the structural and functional issues involved in conducting coordinated reviews of multi-area projects. Options are defined and suggestions for HSA procedures are made.

HRP-0902175/9 PC **A02**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
State Program Agency Procedures in Support of HSA Review of Proposed Uses of Federal Funds Made Available Through State Government.
Apr 80, 20p
Contract PHS-HRA-232-79-0036

Title XV of the Public Health Service Act requires that certain distributions by State government from Federal funds received by the State under entitlements (formula grants), grants, and contracts be reviewed and approved or disapproved by health systems agencies (HSAs). Such distributions of Federal dollars, technically known as 'subventions', are often used by State Program Agencies (SPA) to finance specific activities which support State objectives in a particular topic area, and which are performed by private contractors or by public entities in the State other than State government. Although Federal control over the dollars passes to the State when the distribution plan, program plan, application or contract is approved by the Secretary, the State government must provide an opportunity for an HSA to conduct a review of subventions, as required under s. 1513(e) of the Public Health Service Act. Further, the SPA must withhold funds from projects disapproved by an HSA unless the Governor, upon request of an applicant, decides to make such funds available despite HSA disapproval. This guidance document has been prepared to assist SPAs which administer Federal funds subject to the review requirement in their efforts to design procedures which assure that the intent of the Public Health Service Act is met.

HRP-0902176/7 PC **A02**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
Information Requests by HSAS from Applicants for Federal Funds Subject to Review Under S. 1513(e).
Apr 80, 15p
Contract PHS-HRA-232-79-0036

S. 1513(e) of the Public Health Service Act as amended by Public Law 96-79 requires that Health Systems Agencies (HSAs) review certain proposed uses of Federal funds in their health service area. The outcome of the review is to approve or disapprove the use. If an HSA disapproves a particular use, the Secretary cannot make the funds available unless, following a review requested by the applicant, he/she decides to provide the financial support despite the HSA disapproval. Funds subject to review under s. 1513(e) are those appropriated under authorizations included in the Public Health Service Act, Community Mental Health Centers Act, Sections 409 and 410 of the Drug Abuse Office and Treatment Act, and the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment, and Rehabilitation Act of 1970. Such uses are to be reviewed if the use results in the development, expansion or support of health

resources in the HSA's health service area. In conducting such reviews, HSAs are required to follow the procedures and criteria set forth in section 1532(b) and section 1532(c) of the PHS Act, as well as the regulatory requirements of 122.410 and 122.412 of Title 42, Part 122(E) of the Code of Federal Regulations.

HRP-0902177/5 PC **A02**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
State Health Coordinating Councils: Procedural Guidance for Reviews of Proposed Uses of Federal Funds.
Apr 80, 24p

P.L. 96-79, the 1979 amendments to Titles XV and XVI of the Public Health Service Act, establishes new requirements concerning procedures and criteria for reviews of proposed health systems changes by Statewide Health Coordinating Councils (SHCCs). In addition, the amendments add a new category of review for which the SHCC is responsible, and modifies requirements concerning the outcomes of such reviews. Under earlier statute, the SHCC was not required to develop procedures and criteria to guide its major review activity, the review of state plans for expenditure of formula grant funds. Under the new amendments, the SHCC must adhere to the same requirements as HSAs and State Agencies in the development, adoption and application of procedures and criteria for their review activities. This has been accomplished by making the SHCC subject to all the requirements of s. 1532 of the Act.

LBL-7448 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Biology and Medicine Division Annual Report, 1977.
1977, 97p
Contract W-7405-ENG-48

Individual projects are indexed. (ERA citation 05:014331)

N80-21970/2 PC**$11.00**
National Aeronautics and Space Administration, Washington, DC.
Aerospace Medicine and Biology: Cumulative Index, 1979.
Jan 80, 355p NASA-SP-7011(202)

This publication is a cumulative index to the abstracts contained in the Supplements 190 through 201 of 'Aerospace Medicine and Biology: A Continuing Bibliography.' It includes three indexes-subject, personal author, and corporate source.

PB80-174915 PC **A02**/MF **A01**
State Univ. of New York Downstate Medical Center, Brooklyn. Dept. of Microbiology and Immunology.
Operation of Pneumococcal Polysaccharide Radioimmunoassay Reference Laboratory: Coordination of the Serological Aspects of Otitis Media Field Trials.
Annual rept. 1 Apr 78-30 Apr 79.
May 79, 10p DAB-VDP-06-94
Contract N01-AI-42541
See also PB-297 243.

The pneumococcal reference laboratory provided serological assay data for 34 approved projects which help define the usefulness of the pneumococcal polysaccharide vaccine. Among the projects under investigation include the use of the vaccine for patients with sickle cell anemia, Hodgkin's disease, systemic lupus erythematosus, renal failure and dialysis, multiple myeloma, lymphoma, chronic lymphocytic leukemia, Cooley's anemia and chronic pulmonary disease. Studies are under way in collaboration with the Bureau of Biologics to determine what, if any changes are to be made in the composition of the vaccine to improve efficacy. Studies are continuing on the use of the pneumococcal vaccine to improve immunogenicity in infants in order to optimize protection against otitis media.

PB80-174949 PC **A03**/MF **A01**
Vanderbilt Univ., Nashville, TN. Dept. of Pediatrics.
Antibody Response of Infants to Pneumococcal Polysaccharides.
Annual rept. Jan 78-May 79,
Sarah H. Sell. 1 May 79, 32p DAB-VDP-03-96
Contract N01-AI-5-2538
See also PB-297 282.

Normal, healthy infants (150) were randomly assigned to 6 groups to receive varying doses of octavalent pneumococcal vaccine (Lilly) at 6 and/or 12 months of age. Dosage schedules (in mcg. per component polysaccharide) were: 5/25; 25/25; 50/25; 0/25; 0/50 or 0/0. Clinical reactions to the vaccinations were minimal and brief. Type specific serologic antibody levels were determined by radioimmunoassay on sera drawn pre- and 4 weeks post-vaccination (at ages 6, 7, 12 and 13 months). Results indicated that titers following the 12 month dose were significantly raised (in comparison to controls) in the 5/25 and 0/50 schedules per pneumococcal types 3,7 and 18 while in the 0/25 schedule type 3,7,18 and 23 were raised. In the 5/25 group, antibody levels exceeded 200 mg. ab. N/ml for types 1,3,7,14,18 and 23, while in the unvaccinated controls, none achieved that level.

PB80-175359 PC **A02**/MF **A01**
North Dakota Water Resources Research Inst., Fargo.
Public Health Aspects of Land Disposal of Sugar Refining Wastes by Spray Irrigation.
Technical completion rept. Oct 77-Oct 79,
B. R. Funke. Oct 79, 12p W80-04608, OWRT-A-057-NDAK(1)
Contract DI-14-34-0001-8036
Prepared in cooperation with North Dakota State Univ., Fargo., and North Dakota Univ., Grand Forks.

The potential of a public health hazard caused by the spray irrigation disposal of sugar beet processing wastes contaminated with Salmonella bacteria was investigated at the Hillsboro, North Dakota plant of the American Crystal Sugar Company. Incoming sugar beets are washed, sliced, and processed for sugar extraction. At times all water used is not recycled and lime-mud waters are pumped into an irrigation lagoon and disposed of by spray irrigation. Most-probable-number methods using selective and differential media were used to enumerate the bacteria from various locations in the processing sequence and in the disposal lagoons used. Fecal coliforms were also enumerated by standard methods. Results show that the processing water of the plant often had large populations of both Salmonella and fecal coliform bacteria. Salmonella were found in the irrigation lagoon at some times during the year but not during the warmer months when spraying was done. No Salmonella were found in the soil sprayed with the lagoon water. The source of Salmonella at the plant was found to be the tare soil on the incoming beets. The soil was also the source of the fecal coliforms. However, neither fecal coliforms or Salmonella were found in beet field soils and farmers denied using animal wastes as fertilizer in the fields. The study does not indicate any public health problems as a result of spray irrigation disposal of the sugar beet processing wastes.

PB80-175722 PC **A02**/MF **A01**
Minnesota Univ., Minneapolis. Dept. of Pediatrics.
Pneumococcal Otitis Media in the Chinchilla.
Annual rept. Jun 78-Jun 79,
G. Scott Giebink. Apr 79, 22p DAB-VDP-06-90
Contract N01-AI-52533
See also PB80-149826.

A model for pneumococcal otitis media induced by intranasal inoculation of Streptococcus pneumoniae and negative middle ear pressure in chinchillas was used to evaluate the efficacy of pneumococcal polysaccharide vaccine in preventing the experimental infection. Vaccination with type 7F capsular polysaccharide significantly reduced the frequency of type 7F pneumococcal otitis following nasal colonization, particularly among vaccinated seroconverting animals. Vaccinated non-seroconverting and unvaccinated animals with high serum antibody concentrations were also protected. Serum opsonic activity against type 7F S. pneumoniae in the absence of specific antibody did not prevent otitis media. Pneumococcal otitis media was also induced by simultaneous nasopharyngeal colonization with S. pneumoniae and influenzae A. virus. Six of nine chinchillas colonized simultaneously with both organisms developed pneumococcal otitis media. Otitis media was not observed following viral colonization alone and pneumococcal otitis media developed in only 13% of animals colonized with type 7F pneumococci and not subjected to barotrauma.

PB80-175748 PC **A13**/MF **A01**
Miami Univ., Coral Gables, FL.
An Evaluation of the Impact of Communications Technology and Improved Medical Protocol on Health Care Delivery in Penal Institutions. 1st Interim Technical Report,
Jay H. Sanders, Charles W. Nordwall, and Louis Sasmor. Apr 74, 300p NSF/RA/T-74-217
Grant NSF-GI-39471
Prepared by Westinghouse Electric Corp., Pittsburgh, PA. Health Systems Div. See also Volume 1, PB-274 439.

The report describes the first phase of a telemedicine health care delivery system designed to increase the accessibility of medical care to isolated patients. Three Dade County, Florida prison facilities and Jackson Memorial Hospital in Miami were selected as sites for the project. Prison settings were chosen because they provide a fairly certain patient population who will return for followup visits, they represent a cross-section of society's health needs, and they are prime areas of medical isolation. The program begins by upgrading the current prison health care delivery system ('Existing System') through the use of new and innovative health care delivery techniques. This 'Baseline System' is to operate for six months during which time all of its characteristics will be documented. All system components represent existing rather than new technology since the program does not aim to develop new hardware and technology. It is the integration of these components to augment health care delivery that is unique. The report details development and operation of the Baseline System including the analysis approach, medical care evaluation methodology, and cost analysis and personnel evaluation techniques.

PB80-178585 PC **A20**/MF **A01**
Michigan Univ., Ann Arbor. Health Services Research Center.
Method of Evaluating and Improving Ambulatory Medical Care. Final Report and Executive Summary.
Final rept. 30 Jun 74-31 Aug 78,
Beverly C. Payne, Thomas F. Lyons, Evelyn Neuhaus, Marilyn Kolton, and Louis Dwarshius.
Nov 78, 456p NCHSR-80-35
Grant PHS-HS-01583

A study is reported of the quality of ambulatory medical care involving the performances of 1,135 primary care physicians. Five sites representing solo practice, fee for service group practice, prepaid capitation group practice and university related outpatient care participated in a four year, three data collection, measure of the process and outcome of diagnosis specific medical performances. Specific research interventions with varying intensity were applied to physicians at the five sites. Greatest improvement in performance followed use of feedback plus seminar and follow-up of action steps. Management change added to this effect. Performance measures between U.S. and foreign medical graduates were compared. The foreign graduates scored somewhat better than U.S. counterparts. Best performance was produced by specialists delivering care within a clinical domain of expertise. No uniformly significant differences in performance were found between board and non-board certified physicians or between physicians with more or less than 20 years in practice. Process of care was significantly related directly to outcome for two of the diagnoses studied (angina pectoris and cardiac arrhythmias). Significant correlation between good process and good outcome was dependent on patient compliance for hypertension and urinary tract infections.

PB80-178601 PC **A04**/MF **A01**
National Center for Health Services Research, Hyattsville, MD. Div. of Extramural Research.
Emergency Medical Services Systems Research Project Abstracts, 1979.
Research management series.
Sep 79, 63p NCHSR-80-27, DHEW/PUB/PHS-80-3271
See also PB-292 558.

This document is a compilation of abstracts which describes research grants related to Emergency Medical Services Systems' techniques, methods, devices, and delivery, supported by the National Center for Health Services Research (NCHSR) during 1979. These abstracts contain the objective, scope and findings (or expected findings) for each project. Administrative information, such as grantee institution, address and telephone number of the principal investigator, project period, project funding history, etc., is also included.

PB80-179898 PC **A11/MF A01**
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Communicable Disease Control Planning in Developing Countries: Communicable Diseases Control Planning.
International Health Planning Methods series no. 1,
Karl A. Western, Stanley I. Music, A. N. Angle, S. O. Foster, and R. C. Hogan. 1979, 244p DHEW/PUB/PHS-79-50080
See also Rept. no. 2, PB80-179906. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with White (E. H.) Co., San Francisco, CA.

This volume for the planning and evaluation of communicable disease control programs is the first volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. This volume discusses specific aspects of disease control programs, such as program organization, surveillance systems, and immunization projects. Articles on specific disease and disease types cover malaria, tuberculosis, leprosy, venereal disease, filariasis, schistosomiasis, onchocerciasis, trachoma, bacterial enteric diseases, parasitic enteric disease and rabies. This manual presents the current 'state-of-the-art' in the planning and evaluation of specific disease control programs. It outlines the complexities of epidemiologic interactions between disease causing organisms and their reservoirs and hosts in different geographic, climatologic, and cultural settings. With an understanding of a disease and its epidemiologic correlates in a given setting, effective control methods can be planned and evaluated.

PB80-179906 PC **A07/MF A01**
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Environmental Health Planning in Developing Countries.
International Health Planning Methods series no. 2,
John Hanlon, Vic Wehmann, Gary Hart,, James Thompson, and Irv Taylor. 1979, 127p DHEW/PUB/PHS-79-50081
See also Rept. no. 1, PB80-179898, and Rept. no. 3, PB80-179914. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with White (E. H.) Co., San Francisco, CA., and PLOG, Inc., Reseda, CA.

This environmental health planning manual is the second volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating environmental health planning into national plans for economic development. The manual contains a compilation of assessment issues, data considerations, alternative technologies, and practical planning methods specifically related to developing countries. Three general objectives are used: (1) to describe the inter-related environmental hazards to health relevant to people in developing countries; (2) to identify competing elements, priorities, and institutional relationships affecting available solutions; and (3) to offer components needed to make planning decisions, including recommendations for data collection methods, surveillance methods, standards, and alternative technologies. In addition to the need for fundamental improvements in such areas as drinking water supply, wastewater and excreta disposal, and pest control, the occasionally adverse effect of economic development projects is cited. Examples are drawn from the fields of agriculture, industry, transport, and land use patterns.

PB80-179914 PC **A05/MF A01**
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Health Manpower Planning: Health Manpower Planning.
International Health Planning Methods series no. 3,
Robert J. Staff, and Dennis R. Porter. 1979, 86p DHEW/PUB/PHS-79-50082
See also Rept. no. 2, PB80-179906, and Rept. no. 4, PB80-179922. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with White (E. H.) Co., San Francisco, CA.

This manual for health manpower planning in developing countries is the third volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. Generally, an assessment model for health personnel planning in undeveloped countries is not available. This assessment manual provides a conceptual and methodological framework for the analyst and policy planner for the development and use of health personnel. Health manpower planning is a difficult task, affected by numerous variables. It is also a relatively long range task, since the health manpower supplies of the future must be developed through training and education opportunities years before new practitioners become active in the field. This manual discusses various methods of planning for the use of medical assistants and auxiliaries to provide primary health care in rural areas where it is difficult to attract or maintain full time physicians.

PB80-179922 PC **A05/MF A01**
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Socio-Cultural Factors in Health: Socio-Cultural Factors in Health Planning.
International Health Planning Methods series no. 4,
John Hanlon, and Susan C. M. Scrimshaw. 1979, 79p DHEW/PUB/PHS-79-50083
See also Rept. no. 3, PB80-179914, and Rept. no. 5, PB80-179930. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with White (E. H.) Co., San Francisco, CA., and PLOG, Inc., Reseda, CA.

This manual describes sociocultural and behavioral factors that affect the planning and delivery of health care services in developing countries. It is the fourth volume in a series of works known collectively as the International Health Planning Methods Series. Material selected for use in this volume includes a broad range of sociocultural, psychological and behavioral information. Central and South American, Middle Eastern, Asian and African medical systems are described within a cultural context, and special attention is given to obstacles to the transfer of medical technology. The purpose of this volume is threefold: (1) to identify socio-cultural, psychological and behavioral factors for the benefit of health care planners in developing countries; (2) to discuss principles of culture and cultural change to the extent that it aids effective and responsible health care interventions; and (3) to suggest methods for gaining relevant data for making accurate assessments and effective plans for improved health care.

PB80-179930 PC **A05/MF A01**
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Health Facilities Planning in Developing Countries: Health Facilities Planning.
International Health Planning Methods series no. 5,
Dennis R. Porter, Robert J. Staff, and Melvin Whitfield. 1979, 92p DHEW/PUB/PHS-79-50084
See also Rept. no. 4, PB80-179922, and Rept. no. 7, PB80-179948. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with White (E. H.) Co., San Francisco, CA.

This manual deals with the subject of health facilities planning in developing countries. It is the fifth volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. This manual provides a framework for the planner who is concerned with the development and distribution of various types of health care facilities. While several specific examples are provided to illustrate particular points throughout the text, the emphasis in this manual has been placed on developing a conceptual framework that is useful as a model planning tool that can be adapted to meet local needs and resources. For example, geographical, climatic, and socio-cultural factors should have great impact on the architectural design and site selection of the health facility. While general concerns have been identified here, no attempt has been made to provide a detailed architectural design to meet the needs of each climatic or geographical condition. Specific adaptations must be made by the planner.

PB80-179948 PC **A05/MF A01**
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Pharmaceutical Supply System Planning in Developing Countries: Pharmaceutical Supply System Planning.
International Health Planning Methods series no. 7,
Leif Schaumann, Martin M. Rosner, and John M. Morson. 1979, 93p DHEW/PUB/PHS-80-50086
See also Rept. no. 5, PB80-179930, and Rept. no. 8, PB80-179955. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with White (E. H.) Co., San Francisco, CA., and Stanford Research Inst., Menlo Park, CA.

This manual for pharmaceutical supply systems planning in developing countries is the seventh volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. Generally, less is known about pharmaceutical supply systems than about the overall health care systems of which they are an integral part. Particularly in rural areas of lesser developed countries, the pharmaceutical supply system can be a critical part of the health care system. Evidence suggests that no country possesses an ideal pharmaceutical supply system, and virtually all supply systems are affected to some degree by issues and policies more concerned with politics, economics, education, and law, as well as those governing medicine and public health. This manual provides objective guidelines to assist health care planners to develop improved pharmaceutical supply systems within the framework of national development planning. Particular emphasis has been placed on the importance of making pharmaceutical products available to the rural poor segment of the LDC population.

PB80-179955 PC **A04/MF A01**
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Health Sector Financing in Developing Countries: Health Sector Financing in Developing Countries.
International Health Planning Methods series no. 8,
Robert L. Robertson, Dieter K. Zschock, and John A. Daly. 1979, 69p DHEW/PUB/PHS-79-50087
See also Rept. no. 7, PB80-179948, and Rept. no. 9, PB80-179963. Sponsored in part by Agency for International Development, Washington, DC. Office of Health.

This manual is number eight in a series of studies known collectively as the International Health

Planning Methods Series. The Series provides AID advisors and health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. This manual presents an action-tested procedure for appraisal of health sector financing which may be used, with some local adaptations, to examine health sector financial resources. The guidance presented in the text of the manual, combined with the prototype data collection and tabulation arrangement in Appendix A, are sufficiently detailed to lead a host-country health planner or financial specialist through the assessment process. For successful completion of such an evaluation, it is anticipated that a senior-level economist or public finance specialist would be available to assist the analyst, both in initial design and final interpretation of the results.

PB80-179963 PC A06/MF A01
Public Health Service, Rockville, MD. Office of International Health.
A Compendium of Papers on Community Health Planning Issues: Community Health Planning.
International Health Planning Methods series no. 9,
Paul Ahmed, Aliza Kolker, Susan C. M. Scrimshaw, and Richard H. Hart. 1979, 113p DHEW/PUB/PHS-79-50088
See also Rept. no. 8, PB80-179955, and Rept. no. 10, PB80-179971. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with White (E. H.) Co., San Francisco, CA., and PLOG, Inc., Reseda, CA.

This volume consists of a collection of papers dealing with the integration of community health concerns into development planning. It is the ninth volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. A recognition and concern for the role of health in development planning was the central theme of a three-day conference on Planning for Health Care in the Context of Economic Development held in San Diego during May 1978. Its purpose was to identify problems and suggest solutions which would encourage and improve planning for health care in the developing countries of the world. The articles in this volume are: Bridging the Health Gap: The Use of Indigenous Resources in Meeting the Manpower Requirements of the WHO Definition of Health; Family Composition and Structure in Relation to Nutrition and Health Problems: Impact and Measurement; Rural Health Reorganization in Tanzania: The Implications of Change Implementation; The Community Health Workers: Guidelines for Training the Community to Power the Program; Critical Environmental and Economic Interdependencies: The Search for Societal Values; Health Sector Assessment; Socio-Cultural Factors in Health Planning Throughout the World; and Psycho-Social and Cultural Aspects of International Health Planning: The Challenge of Providing Health Care Assistance to Developing Countries.

PB80-179971 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
A Compendium of Papers on Health and Economic Development: Health or Wealth.
International Health Planning Methods series no. 10,
W. Boyd Littrell, Milton I. Roemer, and Paul O. Wooley. 1979, 97p DHEW/PUB/PHS-79-50089
See also Rept. no. 9, PB80-179963. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with CPI Associates, Inc., Dallas, TX.

This volume deals with the delicate relationship between health and economic development, expressed as a choice between health or wealth. It is the tenth volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. This volume consists of three articles by recognized experts in the field of international health. The papers are: Health, Income Distribution, and Source of Health Expenditures in Developing Countries; A Systems Perspective on Health and Development; and Needed Development Research for Measuring the Health of Populations in the LDCs. The basic dilemma frequently expressed in the form of the following questions: Is economic development essential for improved health or is improved health required for economic development. These three papers point out that neither alternative is very promising unless supported by reliable assessments of local health needs and resources. A suggested middle path includes identification of specific health sector targets, upon which public spending can be concentrated to make a maximum impact upon overall health improvement.

PB80-181670 PC A05/MF A01
Office of Technology Assessment, Washington, DC.
Forecasts of Physician Supply and Requirements.
Apr 80, 96p OTA-H-113

The report was undertaken at the request of the Senate Committee on Labor and Human Resources. It evaluates the assumptions, methods, and results of two current models used to forecast the number and kinds of physicians the country is likely to need and have. The report points out that projections of physician supply and requirements depend on historical data to predict future events. The limits of forecasts must be fully understood if they are to serve as effective tools in the shaping of Federal medical policy. Those limits could be made clearer by explicitly describing the assumptions behind any forecasts, by making alternative forecasts based on different sets of asumptions, and by expanding the forecasting process to include policymakers as well as technicians.

PB80-183734 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies and State-of-the-Art Review for Communicable Diseases Control; Communicable Diseases and Health Planning References.
International Health Planning Reference series no. 1,
James Chin, and Florence R. Morrison. 1979, 80p DHEW/PUB/PHS-79-50090
Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with White (E. H.) Co., San Francisco, CA. See also PB80-183742.

This combined literature review and annotated bibliography of 112 references on communicable disease control in developing countries is the first volume in the series of works known collectively as the International Health Planning Reference Series. The series provides AID advisors and health officials in developing countries with critically needed references for incorporating health planning into national plans for economic development. This volume is intended primarily as a companion piece to volume one in the Method series, entitled Communicable Disease Control Planning. The references included here identify works that support and enlarge upon material contained in the basic manual, but the bibliography makes no claim to be an exhaustive or comprehensive listing of available resources. The topics included are: Why plan health programs; Planning methods; Evaluation of health programs; Communicable disease programs; Summary and conclusions; and Annotated Bibliography.

PB80-183742 PC A09/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies and State-of-the-Art Review for Environmental Health; Environmental Health References.
International Health Planning Reference series no. 2,
Renee White Fraser, and Hadasa Shani. 1979, 192p DHEW/PUB/PHS-79-50091
See also PB80-183734, and PB80-183759. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with PLOG, Inc., Reseda, CA., and White (E. H.) Co., San Francisco, CA.

This combined literature review and annotated bibliography of 462 references deals with environmental factors in health planning for developing countries. Under this title are grouped concerns for pure water supply, systems for wastewater and excreta disposal; pest control, pesticides, pests, and pest control; radiation; occupational health; air quality; food sanitation; noise; and housing. This is the second volume in a series of works known collectively as the International Health Planning Reference Series. The series provides AID advisors and national health officials in developing countries with critically needed references for incorporating health planning into national plans for economic development. This volume is intended primarily as a companion piece to volume two in the Methods series, entitled Environmental Health Planning. References included here identify works that support and enlarge upon material contained in the basic manual.

PB80-183759 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies and State-of-the-Art Review for Health Manpower Planning; Health Manpower Planning References.
International Health Planning Reference series no. 3,
Robert J. Staff. 1979, 83p DHEW/PUB/PHS-79-50092
Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with PLOG, Inc., Reseda, CA., and White (E. H.) Co., San Francisco, CA. See also PB80-183742, and PB80-183767.

This literature review and annotated bibliography of 224 references on health manpower planning for developing countries is the third volume in the series of works known collectively as the International Health Planning Reference Series. The series provides AID advisors and health officials in developing countries with critically needed references for incorporating health planning into plans for economic development. This volume is intended primarily as a companion piece to volume three in the Method, series, entitled Health Manpower Planning. References included here are provided to identify works that support and enlarge upon material contained in the basic manual. The bibliography makes no claim to be an exhaustive or comprehensive listing of all available resources. Topic areas include: Assessment of supply behavior; assessment of demand behavior; assessment of balance behavior; and selected references by category.

PB80-183767 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selcted Bibliographies and State-of-the-Art Review for Socio-Cultural Factors in Health; Socio-Cultural Factors in Health References.
International Health Planning Reference series no. 4,
Renee White Fraser, and Hadasa Shani. 1979, 89p DHEW/PUB/PHS-79-50093
See also PB80-183759, and PB80-183775.Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with PLOG, Inc., Reseda, CA., and White (E. H.) Co., San Francisco, CA.

This combined literature review and annotated bibliography of 193 references on sociocultural factors in health planning for developing countries is the fourth volume in the series of works known collectively as the International Health Planning Reference Series. The series provides AID advisors and health officials in developing countries with critically needed references for incorporating health planning into national plans for economic development. This volume is intended primarily as a companion piece to volume four, Methods Series: Sociocultural Factors in Health Planning. References included here have been selected to identify works that support and enlarge upon material in the basic manual. This volume is divided into sections on: definitions of health; responses to illness; the interaction of traditional medical systems and modern medicine; and conclusions.

PB80-183775 PC A03/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies for Pharmaceutical Supply Systems; Pharmaceutical Supply Systems Bibliographies.
International Health Planning Reference series no. 5,
Leif Schaumann. 1979, 30p DHEW/PUB/PHS-79-50094
See also PB80-183767, and PB80-183783. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with Stanford Research Inst., Menlo Park, CA., and White (E. H.) Co., San Francisco, CA.

This annotated bibliography of 110 references deals with pharmaceutical supply systems as they apply to the needs of developing countries. This work is the fifth volume in the six volume International Health Reference Series of manuals and supporting documents which provides AID advisors and health officials in developing countries with critically needed references in health planning. Its primary objective is to identify alternative methodologies for planning and analyzing pharmaceutical supply systems in rural areas of developing countries. A further objective is to review the literature as it pertains to the provision of pharmaceutical services in LDCs, focusing as much as possible on the rural poor.

PB80-183783 PC A04/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies and State-of-the-Art Review for Health Facilities Planning; Health Facilities Planning References.
International Health Planning Reference series no. 6,
Melvin L. Whitfield, and Wendy Graff. 1979, 52p DHEW/PUB/PHS-79-50095
See also PB80-183775. Sponsored in part by Agency for International Development, Washington, DC. Office of Health. Prepared in cooperation with White (E. H.) Co., San Francisco, CA.

This combined literature review and annotated bibliography of 131 references deals with the subject of health facilities planning for developing countries. It is the sixth volume in the series of works known collectively as the International Health Planning Reference Series. The series provides AID advisors and national health officials in developing countries with critically needed references for incorporating health planning into national plans for economic development. This volur e is intended primarily as a companion piece to volume five in the Methods series, entitled Health Facilities Planning. References included here are intended to identify works to support and enlarge upon material contained in the basic manual. The bibliography makes no claim to be an exhaustive or comprehensive listing of available resources. It contains a literature review on organization and philosophy of health care systems; assessment and planning; utilization; architecture; and climatic conditions.

PB80-183890 PC A04/MF A01
Bureau of Radiological Health, Rockville, MD.
Chest X-Ray Screening Practices: An Annotated Bibliography.
Final rept.,
Marion Torchia, and JoAnne DuChez. Mar 80, 65p FDA/BRH-80/59, DHEW/PUB/FDA-80-8116
Prepared in cooperation with Capital Systems Group., Inc., Rockville, MD.

This bibliography represents one of many professional educational activities designed to eliminate nonefficacious x-ray exposure by educating those individuals responsible for requesting x-ray examinations to the factors that should be considered in the selection process. It was developed to complement the work of the BRH-supported Chest X-Ray Referral Criteria Panel. This panel is working to develop appropriate guidelines for selecting asymptomatic persons for chest x-ray screening examinations. Further, this bibliography will serve as a resource guide for educators, students, radiologists, and other medical specialists. It is divided into 10 main topics and contains references chosen for their relevance to the subject of patient selection. Each article contains an abstract to allow individuals a quick review of an article.

PB80-184344 PC A04/MF A01
National Bureau of Standards, Washington, DC.
Organizations Engaged in Preparing Standards for Dental Materials and Therapeutic Agents with a List of Standards.
Special pub.,
G. C. Paffenbarger, R. W. Rupp, and Margaret Malmstedt. Apr 80, 59p NBS-SP-571
Library of Congress catalog card no. 80-600041.

The first specification for dental materials was prepared by Dr. Wilmer Souder, a physicist at the National Bureau of Standards, in 1927. From this stemmed the specification and certification programs of the American Dental Association (1930) and all of the similar national and international programs. The Federation Dentaire Internationale (FDI) was the first in the international field (1953). Today the International Organization for Standardization (ISO) through its Technical Committee 106-Dentistry, organized in 1963, is the prime international agency formulating specifications for dental materials and devices. The FDI role by agreement with ISO/TC106 is the preparation for standards on clinical evaluations, on biological test methodology, on the preparation of informative reports on dental materials and therapeutic agents and on the proper methods of using them. Today there are 15 international and national agencies that have prepared about 900 specifications for dental materials and devices. These agencies and their addresses are listed, with a brief history of each, together with a list of the specifications and standards that they have promulgated.

PB80-184930 PC A03/MF A01
National Center for Health Services Research, Hyattsville, MD. Div. of Intramural Research.
Estimated Data Collection Organization Effect in the National Medical Care Expenditure Survey (Paper).
Staff paper,
Daniel G. Horvitz, and Steven B. Cohen. 7 Nov 79, 27p NCHSR-80-43
Paper presented at the Annual Meeting of the American Public Health Association (107th), Statistics Sect., 7 Nov 79, New York, NY. Prepared in cooperation with Research Triangle Inst., Research Triangle Park, NC.

The National Medical Care Expenditure Survey has been established to provide an assessment of the utilization, costs and sources of payment associated with medical care in the United States. The complex survey design, which is a stratified multistage area probability design, is further complicated by combining two independently drawn national samples of households from the Research Triangle Institute (RTI) and the National Opinion Research Center (NORC). It is assumed that since the structures of both national area samples are similar, they are thereby generally compatible and allow for the derivation of unbiased national estimates of relevant health parameters. In this paper, the authors produce national parameter estimates and their variances separately for each of the two survey organizations and attempt to determine whether any significant differences exist.

PB80-184948 PC A05/MF A01
American Coll. of Emergency Physicians, Dallas, TX.
Emergency Medical Services Research Conference: Proceedings from a National Conference on Priorities on Emergency Medical Services Research Held at Southfield, Michigan on December 1-2, 1978.
Executive Summary (Final) Sep 78-Aug 79,
Donald L. Krome. 1979, 84p NCHSR-80-44
Grant PHS-HS-03274

The EMS Research Conference, held December 1-2, 1978 in Southfield, Michigan, was intended to identify the information needs of practitioners of emergency medicine, and to suggest a subset of those needs for which research data is desired by the practitioners. The proceedings summarize the priority information needs of the EMS practitioners in the categories of manpower training, clinical services, fiscal and economic implications, and EMS systems. It is anticipated that the report will be used in identifying important elements of the emergency medical services research agenda of the National Center for Health Services Research, contributing directly to improve emergency care and more effective EMS systems.

PB80-185085 PC A03/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Indigenous and Private Health Care Planning in Developing Countries: Indigenous and Private Health Care Planning.
International Health Planning Methods series no. 6,
Paul Ahmed. 1979, 50p DHEW/PUB/PHS-79-50085
See also Number 5, PB80-179930. Prepared in cooperation with White (E. H.) Co., San Francisco, CA., and Stanford Research Inst., Menlo Park, CA. Sponsored in part by Agency for International Development, Washington, DC. Office of Health.

This manual is the sixth volume of the International Health Planning Methods Series. The series provides national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. The manual helps health planners assess the importance, extent, and impact of non-public health care in developing countries. This includes individual and familial health care, indigenous practitioners, and private practitioners trained in the Western medical tradition. Guidelines are provided for assessing the indigenous medical systems and private sector health care in: Assessment of use patterns by characteristics of users, circumstances and frequency of use, and types of services used; the meaning and importance of various available health services to users; assessment of ways of integrating or developing complimentarity between indigenous medicine, the private sector, and public health services.

PB80-810492 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Health Care Facilities Legislation. June, 1977-May, 1979 (Citations from the NTIS Data Base).
Rept. for Jun 77-May 79,
Elizabeth A. Harrison. May 80, 233p
See also June, 1971-May, 1977, NTIS/PS-78/0474.

The selected abstracts of research reports on health care facilities legislation cover the following specific topics: Health care costs, construction, rate regulation, health manpower, rural health services, health planning and quality assurance. Also included is long term care, certificate-of-need, medical malpractice, financial management, and administration. The health care facilities include hospitals, nursing homes, mental health facilities, health maintenance organizations, and extended care facilities. (This updated bibliography contains 226 abstracts, none of which are new entries to the previous edition.)

PB80-810500 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Health Care Facilities Legislation. June, 1979-May, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 79-May 80,
Elizabeth A. Harrison. May 80, 33p
Supersedes NTIS/PS-79/0538 and NTIS/PS-78/0475. See also June, 1971-May, 1977, NTIS/PS-78/0474 and June, 1977-May, 1979, PB80-810492.

The selected abstracts of research reports on health care facilities legislation cover the following specific topics: Health care costs, construction, rate regulation, health manpower, rural health services, health planning and quality assurance. Also included is long term care, certificate-of-need, medical malpractice, financial management, and administration. The health care facilities include hospitals, nursing homes, mental health facilities, health maintenance organizations, and extended care facilities. (This updated bibliography contains 26 abstracts, none of which are new entries to the previous edition.)

PB80-810732 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Patient Satisfaction. 1973-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1973-May 80,
Elizabeth A. Harrison. May 80, 43p

Major components of patient satisfaction are art of care, technical quality of care, accessibility/convenience, finances, physical environment, availability, continuity of care, and efficacy/outcomes of care. Abstracts of reports related to these components are cited. (Contains 37 abstracts)

PB80-922801 PC**$4.50/MF$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Changes in Glycosyltransferase and Glycosidase Activity in the Presence of Cancer.
Oncology overview.
27 May 80, 35p NCI/ICRDB/OT-80/01

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Sialytransferases--preclinical studies; Sialytransferases--clinical studies; Fucosyltransferases--preclinical studies; Fucosyltransferases--clinical studies; Galactosyltransferases--preclinical studies; Galactosyltransferases--clinical studies; Preclinical studies with multiple glycosyltransferases; Clinical studies with multiple glycosyltransferases; and Variations in glycosidases related to the presence of cancer.

PB80-929503 PC**$5.25/MF$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Neoplasms of the Male Reproductive System.
Special listing.
9 May 80, 70p NCI/ICRDB/SL-328
Supersedes NTISUB/E/295-007.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. Approximately 50 different cancer research areas are covered by a separate Special Listing. The research areas include: Carcinogenesis and related studies of prostate biology; Epidemiological studies of prostatic neoplasms; Preclinical and clinical studies of prostatic neoplasms; Carcinogenesis and related studies of testicular neoplasms; Epidemiology of testicular neoplasms; Preclinical and clinical studies of testicular neoplasms; Penile and other male reproductive system neoplasms.

PB80-929605 PC**$6.00/MF$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Humoral and Cellular Immunity to Tumors: Human and Experimental Cancers.
Special listing.
17 Apr 80, 90p NCI/ICRDB/SL-353
Supersedes NTISUB/E/296-011.

The special listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Immunity in patients with specific tumors; Cancer immunity related to antigens and immune complexes; Effect of cancer immunotherapy, transplantation immunology and immune surveillance; Effect of delayed hypersensitivity on the immune response; Effect of other immune modifications; Studies of immunity in experimental cancers; Broad programs and other studies of immunity.

PB80-929607 PC**$6.50/MF$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Occupational and Environmental Carcinogenesis.
Special listing.
2 May 80, 113p NCI/ICRDB/SL-337
Supersedes NTISUB/E/296-012.

The special listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Asbestos exposure and human cancer incidence, and related studies in animal models; Cancer risk and occupational exposure to metallic salts or oxides; Cancer risk associated with occupational exposure to specific organic chemicals; Cancer incidence associated with specific occupations; Relationship of pollution and other environmental factors to human cancer; Systems for detection and measurement of environmental and occupational carcinogens; Other studies on environmental and occupational carcinogenesis.

6F. Environmental Biology

AD-A083 183/4 Not available NTIS
National Research Council of Canada Halifax (Nova Scotia) Atlantic Regional Lab
Effects of Commercial Chlorinated Hydrocarbons and Specific Chlorobiphenyls on the Growth of Seven Species of Marine Phytoplankton,
J. S. Craigie, and O. Hutzinger. 6 May 75, 7p
Rept no. NRCC-14150
Availability: Pub. in Chemosphere, n3 p139-144 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

BNL-27089 PC **A03/MF A01**
Brookhaven National Lab., Upton, NY.
Acidification of Aquatic Ecosystems: Ecosystem Sensitivity and Biological Consequences.
G. R. Hendrey. 1979, 29p CONF-791163-1
Contract EY-76-C-02-0016
Action seminar on acid precipitation, Toronto, Canada, 1 Nov 1979.

The current state of knowledge concerning acidic precipitation is presented at a non-technical level. The chemistry of the acidification of surface waters is explained; areas sensitivie to acid rain as a result of geology and topography are delineated; and the biological consequences of acidification are discussed. (ERA citation 05:014238)

CONF-800225-1 PC **A02/MF A01**
Oak Ridge National Lab., TN.
Regional Ecological Analysis and Data Base Applications.
M. K. Nungesser, and R. J. Olson. 1980, 15p
Contract W-7405-ENG-26
SUGI 80 conference, San Antonio, TX, USA, 18 Feb 1980.

The Geoecology Data Base is used to assess energy-related impacts on ecosystems at regional (multi-county or multi-state) levels. The statistical analysis capabilities of SAS have been used frequently in regional analysis, as in assessing the impacts of sulfur dioxide upon natural vegetation communities or major forest tree species. The results of this application and the uses of SAS in managing the Geoecology Data Base are discussed. (ERA citation 05:016555)

CONF-800319-1 PC **A03/MF A01**
Oak Ridge National Lab., TN.
Field Perturbation Experiments, an Alternate Approach to the Assessment of Human Effects in Terrestrial Ecosystems.
G. W. Suter, II. 1980, 36p
Contract W-7405-ENG-26
US-USSR symposium on biosphere reserves, Flamingo, FL, USA, 8 Mar 1980.

The National Environmental Policy Act of 1969 (NEPA) was initially interpreted as requiring full disclosure of the environmental impacts of a federal action. Because of the limitations of time, money, and manpower, this requirement that all impacts be considered has led to superficial analysis of many important impacts. Data collection has largely been limited to the enumeration of species because this information can be applied to the analysis of any problem. The President's Council on Environmental Quality (CEQ) has provided a solution to this problem by reinterpreting NEPA as requiring analysis of those impacts which have significant bearing on decision making. Because assessment resources can now be concentrated on a few critical issues, it should be possible to perform field perturbation experiments to provide direct evidence of the effects of a specific mixture of pollutants or physical disturbances on the specific mixture of pollutants or physical disturbances on the specific receiving ecosystem. Techniques are described for field simulation of gaseous and particulate air pollution, soil pollutants, disturbance of the earth's surface, and disturbance of wildlife. These techniques are discussed in terms of their realism, cost, and the restrictions which they place on the measurement of ecological parameters. Development and use of these field perturbation techniques should greatly improve the accuracy of predictive assessments and further our understanding of ecosystem processes. (ERA citation 05:016556)

N80-21893/6 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Etekos Experimental Ecosystem.
V. V. Alekseyev, and V. V. Sapozhnikov. Mar 80, 11p NASA-TM-76079
Contract NASW-3198
Transl. Into English from Priroda (USSR), No. 10, Oct. 1979 p 70-75. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Moscow State Univ.

A description is given of an experimental ecosystem, or Etekos, which was developed at the Moscow University. The experiment lasted about one year, and the results obtained are itemized.

N80-21894/4 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Etekos Experimental Ecological System.
V. V. Alekseyev, A. A. Geogiyev, Y. I. Gorbatov, M. Y. Lyamin, and V. N. Maksimov. Mar 80, 9p
NASA-TM-76080
Contract NASW-3198
Transl. Into English from Biol. Nauki (USSR), No. 7, Jul. 1979 p 95-99. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The problem of changes in the ecology resulting, for example, in increases in water temperature because of discharges from large thermal power plants is considered. An experiment creating a model of such an ecological system is described.

PB80-171093 PC **A03/MF A01**
Wisconsin Univ.-Madison. Inst. for Environmental Studies.
Predicting Effects of an Electric Generating Station on Wetland Passerine Birds: Wisconsin Power Plant Impact Study,
Michael John Jaeger. Jan 80, 33p EPA-600/3-80-020
Grant EPA-R-803971
Prepared in cooperation with Wisconsin Public Service Corp., Green Bay, Wisconsin Public Service Commission, Madison, and Wisconsin Dept. of Natural Resources, Madison.

The distribution of breeding passerines (songbirds) was investigated in a wetland in southern Wisconsin to develop a model for use in predicting changes in bird freguencies resulting from environmental alterations. The wetland is adjacent to the cooling lake of a coal-fired electric generating station. The water levels in the wetland are being altered by the cooling lake's effect on the local ground-water system. The model uses information on distributions of bird species along gradients of water depth and vegetation-structure characteristics and information on the relationships between the characteristics to predict changes in bird species' frequencies resulting from increased water levels.

PB80-173669 PC **A13/MF A01**
Maryland Univ., Solomons. Chesapeake Biological Lab.

Results of Benthic Studies at Chalk Point.
Interim rept.,
A. F. Holland, M. H. Hiegel, D. G. Cargo, and N. K. Mountford. Jan 80, 280p UMCEES-80-12-CBL, PPSP/CP-80-2
Prepared in cooperation with Martin Marietta Corp., Baltimore, MD.

This report summarizes the results of annual cycle in the benthos of the Patuxent River and the effects of the Chalk Point Power Station on those benthos.

PB80-175789 PC **A06**/MF **A01**
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Problemas de Contaminacion Y Tratamiento de Contaminantes (Problems of Contamination and Treatment),
Olga Armida Esquivel, Lilia Albert, and Porfirio Aldana. Feb 79, 102p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

This report is a collection of five articles which include: Pesticide in commercial meat products in El Salvador; Pesticides in commercial meats in the San Salvador area; Mexican industrialized food contamination by polychlorinated biphenyls residues; Study of the effects of pesticides on workers of cotton plants; and The treatment of liquid industrial effluents.

PB80-176068 PC **A03**/MF **A01**
National Inst. for Occupatinal Safety and Health, Cincinnati, OH. Div. of Physical Sciences and Engineering.
Assessment of Selected Control Technology Techniques for Welding Fumes.
Research rept.,
Harold D. Van Wagenen. Jan 79, 32p DHEW/PUB/NIOSH-79-125

The report presents results of a National Institute for Occupational Safety and Health (NIOSH) welding fume study undertaken to verify findings for a Battelle Institute laboratory ventilation research study when applied under industrial welding plant conditions. The NIOSH welding fume investigation was conducted at the General Tool Company, Reading, Ohio (a large modern job-shop operation). It verified Battelle's results on effect of air flow direction (in relation to the welder) on fume concentrations in the welder's breathing zone that (1) cross draft air flow (100 cfm at 90 to the welder) significantly lowers breathing zone fume concentration from that prevailing when no directional air flow is employed and (2) with directional air flow from directly behind the welder (100 fpm), breathing zone fume concentration levels are approximately equal to that prevailing when no directional air flow is employed.

PB80-176779 PC **A10**/MF **A01**
California Univ., Berkeley.
Photochemical Oxidant Air Pollution Effects on a Mixed Conifer Forest Ecosystem.
Final rept.,
R. N. Kickert, J. R. McBride, P. R. Miller, C. P. Ohmart, and O. C. Taylor. Jan 80, 215p EPA-600/3-80-002
Contract EPA-68-03-2442
See also PB-274 531.

EPA contract 68-03-2442 provided support for three years of the studies to determine the chronic effects of photochemical oxidant air pollutants on a western mixed conifer forest ecosystem. This report deals with the year 1976-77 and is the final publication on EPA contract 68-03-2442. Computer simulation programs have been written for some of the subsections. Subsystems which received greatest attention during this study were: major tree species response to oxidant dose, tree population dynamics, tree growth, moisture dynamics, soil chemical and physical properties, tree mortality relative to disease, insects and other factors, epidemiology of forest tree pathogens with emphasis on Fomes annosus, cone and seed production, tree seedling establishment, litter production and litter decomposition relative to microfloral decomposer populations.

PB80-182330 PC **A02**
North Carolina Cooperative Fishery Research Unit, Raleigh.
Currituck Sound Fish Populations Before and After Infestation by Eurasian Water-Milfoil,
James C. Borawa, J. Howard Kerby, Melvin T. Huish, and Anthony W. Mullis. 1979, 12p UNC-SGR-147, NOAA-80032815
Pub. in Proc. Ann. Conf. S.E. Assoc. Fish and Wildlife Agencies, v42 p520-528 1979. Prepared in cooperation with North Carolina Wildlife Resources Commission, Raleigh.

Data collected from rotenone samples of 3 coves before (1959-1965) and after (1977) infestation by Eurasian water-milfoil (Myriophyllum spicatum) were compared to document changes in the fish populations. Using the mean of the 3 areas for comparison, both weight and number per hectare increased after water-milfoil infestation. The average weight per individual decreased from 0.02 kg (1959-65) to 0.008 kg (1977). The species were separated into 7 groups. Six of the groups had higher mean numbers per hectare and all groups had higher mean weights per hectare. Multivariate analyses of variance showed that the population structure had changed for numbers and weights per hectare. Ictalurids and yellow perch (Perca flavescens) had the greatest proportionate increases in numbers, whereas largemouth bass (Micropterus salmoides) and white perch (Morone americana) had the greatest proportionate decreases.

PB80-810682 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Salt Marshes. 1977-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-May 80,
Robena J. Brown. May 80, 156p
Supersedes NTIS/PS-79/0548 and NTIS/PS-78/0534. See also 1964-1976, NTIS/PS-78/0533.

Citations dealing with aspects of salt marshes are presented. Most of the topics cover ecology, productivity, pollution effects, and land use effects. (This updated bibliography contains 150 abstracts, 21 of which are new entries to the previous edition.)

6G. Escape, Rescue, and Survival

AD-A083 552/0 PC **A03**/MF **A01**
Aeronautical Systems Div Wright-Patterson AFB OH
Aeronautical Systems Technology Needs Escape, Rescue and Survival.
Annual rept.,
Donald C. Kittinger. Feb 80, 34p Rept no. ASD-TR-80-5010
Supersedes Rept. no. ASD-TR-79-5038 dated Aug 79, AD-A074 906.

This report is a part of a compilation of formalized Technology Needs (TN) covering Equipment Subsystems as identified in the Aeronautical Systems Division. They are based on development/operational experience, systems studies and new concepts - all related to future system applications. Their presentation is to serve a threefold purpose; i.e., (1) guidance for technology program, (2) proven developmental potential, and (3) engineering data/requirements essential for technology use in systems. The identified needs delineate progress desired in performance, control, design flexibility, safety and cost. (Author)

AD-A083 565/2 MF **A01**
Analysis and Technology Inc North Stonington CT
Analysis of Visual Detection Performance for 16-Foot Boat and Life Raft Targets.
Interim rept. Jan 78-Feb 80,
N. C. Edwards, Jr., T. J. Mazour, G. L. Hover, and S. R. Osmer. Feb 80, 180p USCG-D-24-80, CGR/DC-29/79
Contract DOT-CG-81-79-2038
See also report dated Dec 78, AD-A065 118.
Availability: Microfiche copies only.

Since September 1978 the USCG R&D Center has conducted four visual detection experiments to improve the probability of detection in SAR. These are the first in a series of experiments designed to develop visual detection performance models which will be incorporated into the Coast Guard's computer-assisted search planning (CASP) system and the 'National Search and Rescue Manual'. These were controlled experiments involving 82/95-foot cutters, 41/44-foot boats, helicopters, and fixed wing aircraft searching for 16-foot boat and life raft targets anchored at predetermined locations within the search area. Through a microwave ranging system, searcher and target positions could be accurately reconstructed to determine the lateral range of targets that were detected, as well as not detected. Thus, probability of detection versus lateral range curves could be developed and, by integrating these curves, sweep width could also be determined. A total of 2,234 detection opportunities was generated. A sophisticated binary multivariate logistic regression computer program was used to develop sweep width estimates for the environmental conditions experienced. Of the 11 visual detection parameters investigated, visibility, wind speed, swell height, cloud cover, search unit type, target type and color, sun's elevation, and time on task were determined to have a significant effect on sweep width. A more rapid degradation of sweep width was found for deteriorating environmental conditions than is now predicted by the 'National Search and Rescue Manual'. (Author)

6H. Food

AD-A083 161/0 PC **A04**/MF **A01**
Army Natick Research and Development Command MA Food Engineering Lab
Examination of Patient Tray Food Service Equipment/An Evaluation of the Alpha Cart.
Final rept.,
Carol P. Shaw, Gerald A. Darsch, and J. M. Tuomy. Dec 79, 68p NATICK/FEL-100, NATICK-TR-79/036

The patient food cart (Alpha Cart) to be used in their new hospital facility was evaluated for operating and functioning characteristics first with a model bentonite, glycerine water system and then with food products representative of those to be served to patients. The results show that the cart heats very erratically, and substantial differences in heating occur from one trial to another. Testing with food products shows that the cart, even at its highest heater code settings, will not heat all surfaces of many foods above the minimum required 140 F (60 C). The refrigeration unit generally maintains cold foods in the desirable chill temperature range, even while other products are being reheated.

AD-A083 178/4 PC **A05**/MF **A01**
Army Natick Research and Development Command MA Food Engineering Lab
Chemical and Microbiological Analysis of Sliced, Precooked, Canned Bacon.
Final rept.,
G. C. Walker, J. M. Tuomy, O. J. Stark, and E. M. Powers. Sep 79, 77p NATICK/FEL-96, NATICK-TR-79/033

Chemical and physical tests (moisture, salt, protein, fat, ash, pressure and water activity) and microbiological tests (aerobic plate count, yeast and mold, and coagulase positive staphylococci) were conducted on randomly selected samples of canned, precooked bacon. The bacon was produced under contract number DSA 13H-77C-0673, and the tests were conducted because the total amount of bacon from the contract was rejected for failure to comply with the specified moisture-to-salt ratio. The purpose of the testing was to determine if there was any reason to believe that the bacon was acceptable for its intended purpose. The results of the tests indicated that the bacon was not acceptable. The expected to average moisture-to-salt ratios did not comply with the specification and coagulase positive staphylococci were found in nine percent of the samples tested. (Author)

AD-A083 324/4 PC **A02**/MF **A01**
Army Natick Research and Development Command MA Food Engineering Lab
Granular Soy Protein Concentrate as an Extender for Ground Beef.
Technical rept.,
E. R. Baush, J. L. Secrist, W. J. Fitzmaurice, V. Mason, and V. White. Jan 80, 16p NATICK/FEL-102, NATICK-TR-80/010

The Department of Defense is interested in the use of vegetable protein to reduce the amount and cost of beef procured by the Armed Forces. This study was undertaken to determine the storage stability and consumer acceptability of extended ground beef, soy protein concentrate blends having hydrated soy levels of 10 and 20 percent by weight. The prepared blends were stored at 0 F (17.8 C) and withdrawn for evaluation after 3, 6, 9 and 12 months storage. For evaluation, the blends were prepared as meat loaf and hamburger sandwiches in accordance with standard Armed Forces recipes. Sensory evaluation by a consumer test panel using a 9-point sensory quality scale showed that neither time in storage nor composition of the ground beef soy protein concentrate blends had any effect upon the acceptability of the products tested. It was concluded that the use of ground beef soy protein blends can reduce the amount and cost of beef procured by the Armed Forces without a reduction in the quality and acceptability of finished product served to the troops. (Author)

N80-21982/7 PC **A07**/MF **A01**
Texas A and M Univ., College Station. Adriance Lab.
The Effect of Variety and Maturity on the Quality of Freeze-Dried Carrots. The Effect of Microwave Blanching on the Nutritional and Textural Quality of Freeze-Dried Spinach.
Final Report.
1979, 131p NASA-CR-160567
Contract NAS9-12434

Using carrots, the quality of freeze-dried products was studied to determine the optimum varieties and maturation stages for quality attributes such as appearance, flavor, texture, and nutritive value. The quality of freeze-dried carrots is discussed in terms of Gardner color, alcohol insoluble solids, viscosity, and core/cortex ratio. Also, microwave blanching of freeze-dried spinach was studied to determine vitamin interrelationships, anatomical changes, and oxidative deteriorations in terms of preprocessing microwave treatments. Statistical methods were employed in the gathering of data and interpretation of results in both studies.

PB80-170814 PC **A03**/MF **A01**
Escuela Politecnica Nacional, Quito (Ecuador).
Utilizacion de la Harina de Papa en Panificacion (Utilization of Potato Flour in the Making of Bread).
Technical bulletin no. 7,
Oswaldo Proano, Ligia de Benitez, Oswaldo Acuna, and Marco Moran. Dec 74, 43p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

Due to the overproduction of potatoes in Ecuador, there exists the problem of utilization. The physical and chemical characteristics of various flours are discussed with emphasis on potato flour. Tables and graphics of bread at different stages of the baking process are included.

PB80-171234 PC **A04**/MF **A01**
Escuela Politecnica Nacional, Quito (Ecuador).
Utilizacion de la Harina de Yuca en Panificacion (Utilization of Yucca Flour in the Making of Bread).
Technical bulletin no. 8,
Oswaldo Acuna Gordilla. Nov 74, 54p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

A plan for substituting up to 20% of wheat flour for yucca flour is explained in this report. A description is given of the equipment, methods, and nutritional characteristics of the final product using yucca flour. Many tables are included for clarity.

PB80-171242 PC **A03**/MF **A01**
Escuela Politecnica Nacional, Quito (Ecuador).
Utilizacion de la Harina de Arroz en Panificacion (Utilization of Rice Flour in the Making of Bread).
Technical bulletin no. 12,
Ligia de Benitez, Oswaldo Acuna, Marco Moran, Francisco Aulestia, and Alfonso Romero. 1977, 38p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

The characteristics of rice flour and its suitability for making bread are described. Other flours and their properties when mixed with wheat flour are cited. Tables are provided which show color, weight, texture, method of baking, and evaluation of the mixtures.

PB80-171267 PC **A03**/MF **A01**
Escuela Politecnica Nacional, Quito (Ecuador).
La Soya: Fuente de Proteina y Aceite (The Soya Bean: Source of Protein and Oil).
Technical bulletin no. 10,
Jorge Davila Torres. Feb 75, 48p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

Studies are presented on human nutritional requirements and available protein sources, mainly in Ecuador. The characteristics of the soya bean are described. Decisions on the technology to exploit the agricultural and industrial possibilities of the soya bean are discussed. Tables and statistics with information on protein content are provided.

PB80-176985 PC **A03**/MF **A01**
Centro de Investigaciones en Tecnologia de Alimentos, San Jose (Costa Rica).
Posible Transferencia de la Tecnologia para el Desarrollo Rural Basada en la Experiencia de Costa Rica (Possible Transference of Technology for Developing of Rural Areas Based on the Experience in Costa Rica).
Luis Fernando Arias. Nov 79, 32p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

The report presents the exposition of the Programa de Alimentacion y Nutricion (PAN) projects to cover the demands of food required by the population of 700,000 beneficiaries at least twice a day and the politics of the farm and industrial development. The knowledge of agricultural and scientific and technical matters on food and nutrition as integrated for the improvement of the socio/economic and health of the Latin American communities is described.

see individual report for order number and price
Federation of American Societies for Experimental Biology, Bethesda, MD. Life Sciences Research Office.
Evaluation of the Health Aspects of Food Ingredients.
1979,open series
Report of Select Committee on GRAS Substances.

This report, by a group of qualified scientists designated the Select Committee of GRAS Substances (SCOGS), provides an independent supplemental review and evaluation of certain substances as food ingredients when used in foods at present or projected levels. Other documents are also available:

FDA/BF-80/66. Glutamates. 1980, 38p PC A03, MF A01 **PB80-178635**
FDA/BF-80/62. Hydrolyzates. 1980, 25p PC A02, MF A01 **PB80-178643**
FDA/BF-80-65. Vitamin A, Vitamin A Acetate, and Vitamin A Palmitate. 1980, 69p PC A04, MF A01 **PB80-178650**
FDA/BF-80-64. Starter Distillate and Diacetyl. 1980, 28p PC A03, MF A01 **PB80-178668**
FDA/BF-80-63. Iron and Iron Salts, 1980, 77p PC A05, MF A01 **PB80-178676**

PB80-180219 PC **A02**
North Carolina State Univ. at Raleigh. Dept. of Food Science.
Textural Characterization of Squid 'Loligo pealei Lesuer': Scanning Electron Microscopy of Cooked Mantle,
W. Steven Otwell, and Donald D. Hamann.
c1979, 9p UNC-SG-R-137, NOAA-80032818
Grant NOAA-04-6-158-44-54
Pub. in Jnl. of Food Science, v44 n6 p1629-1635 1979.

SEM was used to reveal progressive structural alterations in the tissue components of cooked squid mantle. Progressive changes were observed at various cook temperatures, 50, 60, 70, 80 and 100C and after different periods of cooking, 1, 2, 4, 8, 16, 32 and 64 min at 100C. Thermal alterations of connective tissues first appeared as interfibril 'melting,' then total fiber gelatinization at higher temperatures. The onset temperatures of 'melting' and gelatinization differed depending on the anatomical location of the connective tissue tunics. Thermal alterations of muscle fibers appeared as a loss of myofibril distinction first evident at 50C. Increasing temperature of muscle fibers caused, in order, coagulation of sarcoplasmic proteins, disintegration of the sarcoplasm, and continuous fiber shrinkage and dehydration. These changes in tissue structure were partially explained by simultaneous changes in gross body dimensions, and mantle pH, moisture, and protein content. (Copyright (c) 1979 Institute of Food Technologists.)

PB80-180227 PC **A02**
North Carolina State Univ. at Raleigh. Dept. of Food Science.
Textural Characterization of Squid 'Loligo pealei L.': Instrumental and Panel Evaluations,
W. Steven Otwell, and Donald D. Hamann.
c1979, 9p UNC-SG-R-138, NOAA-80032819
Grant NOAA-04-6-158-44054
Pub. in Jnl. of Food Science, v44 n6 p1636-1643 1979.

Instrumental tests and profile panel evaluations were used to characterize the textural attributes of squid mantles cooked in water to 50, 60, 70, or 80C, or cooked for 1, 4, 8, 16, or 32 min after reaching 100C. A comparison of results from each specific cook treatment was used to interpret textural changes caused by heat and duration of heating at 100C. Shear type tests, a single blade, and a punch and die, demonstrated that the amount of force and energy required to cut cooked mantles was dependent upon the orientation of the shearing apparatus relative to the direction of muscle fibers and on the side of the mantle initially cut. These anisotrophic and nonhomogeneous aspects of the cooked mantle are due to thermal hardening of muscle fibers and to the distribution and heat gelatinization of connective tissues. A unique isometric tension test demonstrated that hydrothermal shrinkage of connective tissues also influenced squid texture. Panel evaluations indicated that two groupings of textural character notes best described texture of cooked squid. Character notes assessing mantle strength correlated with the results of rheological tests. Character notes denoting mantle moisture were not explained by instrumental tests, but were an essential supplement describing the mouthfeel of cooked squid. (Copyright (c) 1979 Institute of Food Technologists.)

PB80-182306 PC **A02**
North Carolina State Univ. at Raleigh. Dept. of Food Science.
Sensory and Instrumental Evaluation of Material Properties of Fish Gels.
Sea Grant reprint,
D. E. Hamann, and N. B. Webb. c1979, 15p
UNC/SGR-136, NOAA-80032817
Grant NOAA-04-6-158-44054
Pub. in Jnl. of Texture Studies, v10 p117-130 1979.

The present work was part of a larger study to evaluate the texture producing quality of mechanically deboned fish tissues from 4 species from the Gulf of Mexico and 2 species from the North Carolina coast subjected to various periods of frozen storage. Over 100 heat coagulated fish pastes with widely varying sensory texture properties were prepared and evaluated. Variations in species, geographical source of fish, cooking procedure and other variables provided a wide range in material properties.

PB80-184443 PC **A13**/MF **A01**
New York Univ., NY.
Comparison of Alternate Market Forms of Hospital Foods: Final Report and Executive Summary.
Final rept. 5 May 79-15 Feb 80,
Rita Franzese. 28 Feb 80, 283p NCHSR-80-42
Grant PHS-HS-03680

The purpose of this research was to describe different market forms in which menu items are purchased for patients, and to compare food cost, nutrient value, and quality of alternate market forms of selected menu items: Data were collected from

90% of the hospitals in New York City. Food service directors reported market forms purchased for patients. These data, and the extent to which convenience foods are used in diferent settings are reported. Orange juice and sliced turkey were selected to compare cost, nutrient value and quality. Findings indicated that nutrient value and quality were not related to food cost. Highest ascorbic acid and quality ratings, and lowest costs were found for frozen concentrated orange juice. For turkey, no differences were found across market forms in protein and thiamin. Lowest portion costs and moderate quality were found for ready-to-cook, whole frozen turkeys.

PB80-806987 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Microwave Food Processing, Except Home Cooking. January, 1972-December, 1979. (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Dec 79,
C. Gilbert Young. May 80, 190p
Sponsored in part by National Technical Information Service, Springfield, VA.

Microwave processing of foods and beverages, and measurements by means of microwaves, are covered in this collection of citations from the world food literature. Microwave home cooking is treated in another report. Some of the subjects included here are microwave drying, roasting, vacuum drying, freeze drying, bacteria killing, softening of butter, thawing, blanching, dehydration, sterilization, and pasteurization. Measurements of solids content and moisture content are described. Packaging, fast foods, processing, and marketing are also mentioned. (Contains 203 abstracts)

PB80-807134 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Glucose in Foods. December, 1977-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Dec 77-Dec 79,
C. Gilbert Young. May 80, 186p
Sponsored in part by National Technical Information Service, Springfield, VA.

Glucose, its appearance and formation in foods, and its effects on humans and animals, is the subject of this two-year survey of the world food literature. Methods of detection and measurement of glucose levels are described. In addition, enzymes involved in the generation of glucose, the effects of glucose on bacillus growth, and the production of fructose and dextrose from glucose are covered. (Contains 197 abstracts)

PB80-807142 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Coffee: Production, Use, and Health Effects. July, 1978-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jul 78-Dec 79,
C. Gilbert Young. May 80, 159p
Sponsored in part by National Technical Information Service, Springfield, VA.

Citations from the world literature on many facets of the coffee industry are listed from published articles, reports, theses, patents, and symposia proceedings. Sources and production methods, including drying, decaffeination and packaging, are described. Measurements of caffeine and moisture levels are delineated. Shelf life extension methods, and techniques for the removal of taste irritants are mentioned. The packaging, sale and use of coffee is discussed. (Contains 196 abstracts)

PB80-807159 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Thickeners and Gelling Agents in Foods. January, 1972-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Dec 79,
C. Gilbert Young. May 80, 172p
Sponsored in part by National Technical Information Service, Springfield, VA.

Thickeners and gelling agents is the subject of this eight-year retrospective survey of the world literature on foods and the food industry. Cited articles, books, patents, and the other sources describe the sources of thickeners and gelling agents, manufacturing methods, uses, and measurements of mechanical, chemical and nutritional properties. Also treated are the rules and regulations governing the use of thickeners and gelling agents. (Contains 178 abstracts)

PB80-807175 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Shelf Life of Foods. November, 1972-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Nov 72-Dec 79,
C. Gilbert Young. May 80, 210p
Sponsored in part by National Technical Information Service, Springfield, VA.

This collection of citations from the world food literature surveys the broad subject of the shelf stability of foods. Methods of extending food shelf life by means of chemical dips and treatments, various forms of radiation, vacuum packaging, and different packaging methods and materials, are described. Most foods and drinks are mentioned. (Contains 200 abstracts)

PB80-807183 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Salmonella in Foods. October, 1977-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Oct 77-Dec 79,
C. Gilbert Young. May 80, 190p
Sponsored in part by National Technical Information Service, Springfield, VA.

The appearance and consequences of salmonella in foods for human consumption are covered in the cited abstracts from the world food literature. Salmonella detection, control and inactivation methods, and determinations of infective dosages, are described. Trends in salmonella infection outbreaks are delineated. (Contains 200 abstracts)

PB80-807191 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Food Storage in Controlled Atmospheres. February, 1973-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Feb 73-Dec 79,
C. Gilbert Young. May 80, 183p
Sponsored in part by National Technical Information Service, Springfield, VA.

The use of a controlled atmosphere to enhance the storage life of various foods is described in the cited references. The use of high and low concentrations of oxygen, carbon dioxide, nitrogen, and nitrous oxide, and ethylene, ethylene oxide, sulfur dioxide, or dichlorodifluoromethane, and the resultant effects on the stored foods, is covered. Differences in atmospheric pressure, temperature, and humidity are also discussed relative to their influence on food storage quality. (Contains 200 abstracts)

PB80-807217 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Benzopyrene in Foods. March, 1972-December, 1979. (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Mar 72-Dec 79,
C. Gilbert Young. May 80, 97p
Sponsored in part by National Technical Information Service, Springfield, VA.

Benzopyrenes and their occurrence in foods are described in the cited works. The sources of the benzopyrenes, methods of detection, and the effects of cooking, smoking, and other food-processing techniques on the benzopyrene level, are listed. The putative effects on human health are discussed. (Contains 95 abstracts)

PB80-807258 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Saccharin in Foods. January, 1972-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Dec 79,
C. Gilbert Young. May 80, 142p
Sponsored in part by National Technical Information Service, Springfield, VA.

The citations in this bibliographic search treat the manufacture and use of saccharin as a food sweetener. The synthesis, purity, stability, human body absorption, excretion, and metabolism, carcinogenic activity, and teratogenic activity of saccharin are discussed. The history, use, and legal status, including patents, laws, and regulations in the U.S., are included. Tests on animals are detailed. The question of the possible risk of cancer of the bladder through the ingestion of saccharin, versus the risks associated with obesity from sugar calories, is treated. Numerous analytic techniques are detailed. Trade offs in keeping quality of fruit-juice beverages sweetened with sugar, or with saccharin, are examined. (Contains 165 abstracts)

PB80-807290 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Preservation of Food. April-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Apr-Dec 79,
C. Gilbert Young. May 80, 169p
Sponsored in part by National Technical Information Service, Springfield, VA.

Preserves, and the preservation of foods, are described in this survey of the world literature on foods and the food industry. Preservation methods employing chemical, food additive, or modification techniques, rather than long-term storage methods such as freezing, canning or vacuum packaging, are discussed. (Contains 196 abstracts)

PB80-807332 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Freeze Drying of Foods. November, 1975-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for May 80,
C. Gilbert Young. May 80, 177p
Sponsored in part by National Technical Information Service, Springfield, VA.

The works cited in these abstracts cover the freeze drying of foods and juices, in combination with vacuum, infrared radiation, preheating, chemical, microwave or other forms of energy. Analyses are presented of the energy efficiency, storage life, and resultant nutritional and other food quality attributes resulting from the freeze drying process. (Contains 200 abstracts)

PB80-807365 PC N01/MF N01
New England Research Application Center, Storrs, CT.
FDA and Food and Agriculture Organization (FAO) Actions. January, 1972-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Dec 79,
C. Gilbert Young. May 80, 188p
Sponsored in part by National Technical Information Service, Springfield, VA.

The cited works from the world food literature cover governmental and organizational laws, standards, regulations, and involvements pertaining to the human food chain. Both the Food and Drug Administration (FDA) and the Food and Agriculture Organization (FAO) are covered, with some additional references to the World Health Organization (WHO). (Contains 194 abstracts)

PB80-807373 PC N01/MF N01
New England Research Application Center, Storrs, CT.
The Margarine Industry. August, 1976-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Aug 76-Dec 79,

C. Gilbert Young. May 80, 182p
Sponsored in part by National Technical Information Service, Springfield, VA.

Raw materials sources, manufacturing and processing methods, packaging, sales and marketing, and use, of various margarine products are described in the cited abstracts. In addition, measurements of vitamin content, contaminants, physical properties, calorie count, and nutritional values are discussed. The question of the relationship of food fats and human health is addressed. (Contains 200 abstracts)

PB80-807399 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Winemaking. May, 1978-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for May 78-Dec 79,
C. Gilbert Young. May 80, 170p
Sponsored in part by National Technical Information Service, Springfield, VA.

The winemaking industry is the subject of this collection of recent citations from the world literature. Growth of grapes and other wine sources, such as apples, harvesting, design and construction of various types of vats, bottling and distribution of wines is described. In addition, the effects of microorganisms, enzymes, yeasts, and bacteria on wines are discussed. (Contains 200 abstracts)

PB80-807431 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Cheese Industry. September, 1979-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Sep-Dec 79,
C. Gilbert Young. May 80, 187p
Sponsored in part by National Technical Information Service, Springfield, VA.

Many types of cheese, and a large range of cheesemaking methods and equipment, are cited in this four-month vignette of the literature from the cheese industry. Also described are packaging and marketing aspects of cheese products. (Contains 199 abstracts)

PB80-807449 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Canning of Foods. February, 1977-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Feb 77-Dec 79,
C. Gilbert Young. May 80, 179p
Sponsored in part by National Technical Information Service, Springfield, VA.

Both home and commercial canning are covered in this set of citations from the world food literature. Foods specifically designed for canning, and various canning methods are mentioned. Can design, materials selection, and plating and coating materials and methods are delineated. Changes in foods as a result of the canning process are discussed. (Contains 196 abstracts)

6J. Industrial (Occupational) Medicine

K/D-5075 PC **A02**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Changing Requirements of Safety/Health Education in Industry (U).
J. T. Blackmon, Jr. 1 Mar 80, 24p CONF-800321-1
Contract W-7405-ENG-26
Association for the Advancement of Health Education conference, Nashville, TN, USA, 1 Mar 1980.

This commentary reviews for the safety/health educator how a business manager must achieve efficient production and presents the idea that on-the-job safety/health concerns must be integrated into this efficient production process. A success story of how a major division of one corporation has achieved an enviable occupational safety/health record with input from its own cadre of safety/health professional is discussed. However, this same organization has not achieved the same success with off-the-job injuries and illnesses. It is in this latter area that industry needs help from the safety/health education professional - namely, give the future employee the tools with which to judge the risk of living with potential technological hazards so that society as a whole can benefit. (ERA citation 05:016905)

PB80-175698 PC **A06**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Criteria Documentation and Standards Development.
Reliability and Utilization of Occupational Disease Data.
Technical rept.,
Vernon E. Rose. Jun 77, 161p DHEW/PUB/NIOSH-77-189

Knowledge as to the scope and magnitude of the occupational health problem in this country is a necessary prerequisite in organizing and implementing control programs. Prior to passage of the Occupational Safety and Health Act of 1970, occupational disease reporting as required under state laws was considered nonfunctional. The new legislation required, among other things, the U.S. Department of Labor to design and implement a system which would make employers responsible for recording and reporting occupational diseases and injuries. Although the Federal government, in cooperation with state governments, implemented a data collection and analysis system for occupationally related diseases (and injuries), several major deficiencies limit the usefulness of the effort.

PB80-175706 PC **A09**/MF **A01**
American Medical Association, Chicago, IL. Dept. of Environmental, Public and Occupational Health.
Occupational Safety and Health Symposia, 1978,
R. H. Wheater, and Loren L. Hatch. Jun 79, 178p DHEW/PUB/NIOSH-80-105
Contract PHS-CDC-210-78-0053
See also PB-297 805.

These Proceedings, the fifth in a series of NIOSH Occupational Safety and Health Symposia, are a compilation of papers presented during the 38th AMA Annual Congress on Occupational Health at the University of Arizona Health Sciences Center, Tucson, Arizona from September 14-16, 1978. While adhering to its tradition of bringing to the practicing physician--and especially the part-time occupational physician--the latest developments in the field of occupational health and safety, this Congress was somewhat unique: not only did the meeting take place within a university environment, but this particular site was one of the newly formed Educational Resource Centers which had been established by NIOSH. Thus, as evidenced by the content of the papers in this volume, the conference should have appealed to the broadest possible spectrum of occupational health professionals--academicians, practitioners, and students. Topics ranged from legal issues (such as the confidentiality of medical records) to some of the more pressing health problems of the day (i.e., reproductive disorders of both the male and female workers, injuries to the extremities, pesticide problems, nonpneumoconiotic diseases of the lung, cancer, and arthritides).

PB80-175870 PC **A08**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Criteria Documentation and Standards Development.
Criteria for a Recommended Standard: Occupational Exposure to Dinitro-Ortho-Cresol,
David J. Brancoto. Feb 78, 159p DHEW/PUB/NIOSH-78-131
Contract PHS-CDC-99-74-31

The Occupational Safety and Health Act of 1970 emphasizes the need for standards to protect the health and safety of workers exposed to an ever-increasing number of potential hazards at their workplace. The formal system of research, with priorities determined on the basis of specified indices, to provide relevant data from which valid criteria for effective standards can be derived. Recommended standards for occupational exposure, which are the result of this work, are based on the health effects of exposure. The Secretary of Labor will weigh these recommendations along with other considerations such as feasibility and means of implementation in developing regulatory standards. It is intended to present successive reports as research and epidemiologic studies are completed and as sampling and analytical methods are developed. Criteria and standards will be reviewed periodically to ensure continuing protection of the worker.

PB80-175979 PC **A06**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Technical Services.
A Management System for Occupational Safety and Health Programs for Academic Research Laboratories.
Research rept.,
Sandra L. Smith, Gretchen L. Schultze, and Blair H. Curry. Jan 79, 114p DHEW/PUB/NIOSH-79-121
Contract PHS-210-77-0091
Prepared in cooperation with Kirschner and Associates, Inc., Washington, DC.

This report addresses the special problems associated with introducing a management systems approach to occupational safety and health programs which relate to university research environments. Much of the written material about the management of safety and health programs is based on industrial environments. Frequently, this writing is not easily applicable to a non-profit or university environment.

PB80-176381 PC **A06**/MF **A01**
National Inst. for Occupational Safety and Health, Morgantown, WV. Div. of Safety Research.
Safety Program Practices in Record-Holding Plants.
Research rept.,
Robert Cleveland, H. Harvey Cohen, Michael J. Smith, and Alexander Cohen. Mar 79, 123p DHEW/PUB/NIOSH-79-136

This study is the third phase in a series of investigations examining safety program practices in industry. A survey of five companies was undertaken to obtain a more complete understanding of effective safety programming. The five plants were recognized industry leaders as of 1974 in man-hours worked without a disabling injury. Three were chemical plants, one was a textile plant, and one was a photoflash consumer products manufacturing plant. These five National Safety Council award winners were studied with a questionnaire used in a previous NIOSH study (Cohen, Smith, Cohen, 1975). Follow-up site visits to the companies were undertaken to verify in more detail the elements of successful safety programming.

PB80-176563 PC **A07**/MF **A01**
SRI International, Menlo Park, CA.
Health Consequences of Shift Work,
Donald L. Tasto, Michael J. Colligan, Eric W. Skjei, and Susan J. Polly. Mar 78, 140p DHEW/PUB/NIOSH-78-154
Contract PHS-NIOSH-210-75-0072

This 30-month study, conducted by SRI and sponsored by the National Institute for Occupational Safety and Health, investigated the effect of working unconventional hours, i.e., afternoon, night, and rotating shifts, on the psychological and physiological well-being of workers. Data for a sample of about 1,200 nurses and a similar number of food processors were collected by review of health and accident files and from the administration of a lengthy questionnaire. Areas of inquiry included: basic subject demography (e.g., age, sex, race, marital status, and length of employment), incidence and prevalence of physical complaints and illness histories; eating patterns; sleep patterns; medication usage; life style and domestic patterns; and psychological profiles. The results of extensive computer analyses of the health and accident records and the questionnaire data are reported in separate sections of this report.

PB80-184369 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Review of Current Codes and Standards for Scaffolds,
S. George Fattal, Christopher L. Mullen, Hai S. Lew, and Bernard J. Hunt. Apr 80, 71p NBSIR-79-1937

Sponsored in part by National Inst. for Occupational Safety and Health, Rockville, MD.

This report presents a critical review of the provisions in existing codes and standards for the design, erection, operation and maintenance of scaffolds used in construction work and other applications. The requirements in these documents were examined from the standpoint of clarity, consistency and completeness. Ambiguities arising from conflicting requirements or from provisions that led to more than one interpretation, and lack of consideration of major safety-related structural, environmental and human factors are highlighted. In addition, the adequacy of, and the rationale behind, the prescribed provisions are examined. These are supplemented by a specific application appearing in Appendix B. Appendix A illustrates common types of scaffolding systems that have been addressed by at least one of the codes or standards examined. The findings of this study serve to identify principal areas of needed research to improve present scaffolding practices.

6K. Life Support

AD-A083 486/1 PC **A02/MF A01**
Foreign Technology Div Wright-Patterson AFB OH
New Spacesuit--A Space 'Mini-House',
Ljubo Izvoric. 9 Apr 80, 5p Rept no. FTD-ID(RS)T-0236-80
Edited trans. of Covjek i Svemir (Yugoslavia) v22 n2 p10 1978/1979.

No abstract available.

N80-21981/9 PC **A04/MF A01**
Life Systems, Inc., Cleveland, OH.
Testing Evaluation of the Electrochemical Organic Content Analyzer.
Final Report.
R. J. Davenport. Nov 79, 69p NASA-CR-160569, LSI-TR-334-4
Contract NAS9-15402

The breadboard electrochemical organic content analyzer was evalauted for aerospace applications. An awareness of the disadvantages of expendables in some systems resulted in an effort to investigate ways of reducing the consumption of the analyzer's electrolyte from the rate of 5.17 kg/30 days. It was found that the electrochemical organic content analyzer can result in an organic monitor in the water quality monitor having a range of 0.1 to 100 mg/1 total organic carbon for a large number of common organic solutes. In a flight version it is anticipated the analyzer would occupy .0002 cu m, weigh 1.4 kg, and require 10 W or less of power. With the optimum method of injecting electrolyte into the sample (saturation of the sample with a salt) it would expend only 0.04 kg of electrolyte during 30 days of continuous operation.

6L. Medical and Hospital Equipment

AD-A083 463/0 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Electrical Engineering
A Dynamic Electroencephalogram Frequency Analyzer,
Errol E. Wallingford, and W. R. Collins. 1 Aug 77, 4p DRB-REPRINT-4210
Availability: Pub. in IEEE Transactions on Instrumentation and Measurement, vIM-27 n1 p70-73 Mar 78 (No copies furnished by DTIC/NTIS).

No abstract available.

PATENT-4 161 950
Not available NTIS
Department of Energy, Washington, DC.
Electrosurgical Knife.
Patent,
J. D. Doss, R. E. Cowan, R. H. Newell, and C. W. McCabe. Filed 1 Aug 75, patented 24 Jul 79, 4p PAT-APPL-601 113
Supersedes PAT-APPL-601 113-75.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An electrosurgical knife blade of insulating material having a pair of electrodes adapted to be connected to a radiofrequency generator is described. (ERA citation 05:021264)

PB80-180284 PC **A04/MF A01**
Food and Drug Administration, Silver Spring, MD. Bureau of Medical Devices.
Electromagnetic Compatibility Standard for Medical Devices.
Technical rept.
1 Oct 79, 62p FDA/BMD-80/71, MDS-201-0004
See also PB-271 635.

This standard establishes maximum levels of electromagnetic emissions which medical devices are allowed to produce and it establishes minimum levels of electromagnetic interference to which medical devices must not be susceptible. A section containing test methods is included to provide a consistent means of verifying compliance with the requirements. Appendix A contains a rationale which provides technical support for the requirements and test methods incorporated into this standard.

6M. Microbiology:

AD-A083 348/3 Not available NTIS
Army Medical Research Inst of Infectious Diseases Frederick MD
Liquid Medium for Growth of Legionella pneumophila,
Joseph D. Ristroph, Kenneth W. Hedlund, and Richard G. Allen. 1980, 3p
Supersedes report dated 6 Aug 79, AD-A074 767.
Availability: Pub. in Jnl. of Clinical Microbiology, v11 n1 p19-21 Jan 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 502/5 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
Genetic Control of Susceptibility to Salmonella Typhimurium in Mice: Role of the LPS Gene.
Medical research progress rept.,
Alison D. O'Brien, David L. rosenstreich, Irwin Scher, Gary H. Campbell, and Richard P. MacDermott. 26 Jun 79, 8p Rept no. NMRI-80-2
Pub. in The Jnl. of Immunology, v124 n1 p20-24 Jan 80.

No abstract available.

JEN-437 PC **A04/MF A01**
Junta de Energia Nuclear, Madrid (Spain).
Study of the Phage Production Efficiency in the Bacterian Lysis Processes.
R. Vidania, F. Garces, and C. A. Davila. 1979, 65p
In Spanish.
U.S. Sales Only.

A search for the best production conditions of lambda vir and lambda clear phages in E coli K12 and E coli C sub 6 00 infected cells respectively is presented. By keeping fixed some parameters of the process as the bacterial and phage generation times and the bacterial burst side, it has been found that the lysis yield is strongly dependent on the multiplicity and in a lesser degree on the infection time. It appears from the experimental results that other variables are important, as infection efficiency and approach time from phages to bacteria. The lysis phenomenon by a numerical model on the bases of those experimental results is described. (Atomindex citation 10:476529)

N80-21965/2 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Scenedesmus Acuminatus Green Algae Extracts on the Development of Candida Lipolytic Yeast in Gas Condensate-Containing Media.
B. I. Bilmes, G. A. Kasymova, V. I. Runov, and N. N. Karavayeva. Mar 80, 7p NASA-TM-76081
Contract NASW-3198
Transl. into English from Uzh. Biol. Zh. (USSR), No. 4, Apr. 1979 p 12-14. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Data are given of a comparative study of the growth and development as well as the characteristics of the biomass of the C. Lipolytica yeast according to the content of raw protein, protein, lipids, vitamins in the B group, and residual hydrocarbons during growth in media with de-aromatized gas-condensate FNZ as the carbon source with aqueous and alcohol extracts of S. acuminatus as the biostimulants. It is shown that the decoction and aqueous extract of green algae has the most intensive stimulating effect on the yeast growth. When a decoction of algae is added to the medium, the content of residual hydrocarbons in the biomass of C. lipolytica yeast is reduced by 4%; the quantity of protein, lipids, thamine and inositol with replacement of the yeast autolysate by the decoction of algae is altered little.

PB80-175029 PC **A03/MF A01**
North Dakota Water Resources Research Inst., Fargo.
Biodegradation of Thiocyanate by Microorganisms Isolated from Gas Liquor.
Technical completion rept. Oct 76-Sep 78,
James R. Fleeker. Nov 78, 29p W80-04605, OWRT-A-054-NDAK(1)
Contract DI-13-34-0001-7072
Prepared in cooperation with North Dakota State Univ., Fargo., and North Dakota Univ., Grand Forks.

Enrichment culture techniques were used to isolate an Arthrobacter species capable of using thiocyanate as a nitrogen source. Thiocyanate, a pollution indicator, is found in waste waters from coal gasification and coke production. Two enrichment media were used, a carboxylic acid-mineral medium (CM) and a glucose-mineral medium (GM); both were successful in producing isolates. The colony studied was isolated from a soil sample taken adjacent to a railroad bank and was isolated with the GM enrichment medium. The Arthrobacter isolated is gram-positive, heterotrophic, polymorphic, and grows in salmon-colored, opaque colonies. It is able to grow on alcohols, amines, carbohydrates, and acids. The Arthrobacter can degrade thiocyanate even in the presence of ammonium or nitrate ions. It tolerates thiocyanate in concentrations up to 0.1M. Analytical methods used include spectrophotometry, paper chromatography, guanine-cytosine content analysis, and radioisotopic analysis. Radioactive thiocyanate and the release of radioactive CO2 were used to monitor decomposition rates. Results show that thiocyanate degradation falls to low levels as growth approaches the stationary phase. Unsuccessful attempts were made to produce a cell-free extract of the Arthrobacter that could chemically change thiocyanate.

PB80-184666 PC **A02**
Hawaii Univ., Honolulu.
Recovery, Survival and Dissemination of Human Enteric Viruses in Ocean Waters Receiving Sewage in Hawaii,
Philip C. Loh, Roger S. Fujioka, and L. Stephen Lau. c1979, 22p UNIHI-SG-JC-80-08, NOAA-80041403
Pub. in Water, Air, and Soil Pollution, v12 p197-217 1979.

A commercial model of a portable virus concentrator operating on the principle of the membrane virus adsorption-elution technique was used to examine the recovery and distribution of human enteropathogenic viruses in Hawaiian waters receiving sewage wastes. Although operating at an efficiency of 20%, a variety of human enteric viruses was isolated, including polioviruses, Coxsackievirus and Echoviruses. Positive virus isolations were consistently made and at high concentrations at sampling stations closest to the sewage outfall. The frequency of virus isolations decreased with increasing distance from the discharge site. Viruses were recovered in all directions from the outfall and even as far as 3.2 km east but not 6.4 km away from the discharge site. Tidal conditions to some degree were found to influence the dissemination of viruses. However, since sampling was generally performed at the surface of the water, the influence of winds and surface currents was more difficult to assess. Although a positive correlation was found between the presence of high concentrations of indicator coliforms and viruses in waters closest to the discharge site, this relationship was not seen at sampling stations farther away.

6O. Pharmacology

AD-A083 059/6 Not available NTIS
Defence Research Establishment Suffield Ralston (Alberta)
Effect of Atropine upon the Cardiovascular System during Soman-Induced Respiratory Depression,
J. A. Lipp. 28 Jul 75, 9p
Availability: Pub. in Archives Internationales de Pharmacodynamie et de Therapie, v220 n1 p19-27 Mar 76 (No copies furnished by DTIC).

No abstract available.

AD-A083 110/7 PC **A02/MF A01**
School of Aerospace Medicine Brooks AFB TX
massive Eosinophilic Reaction to Desipramine,
David R. Jones, and Thomas R. Maloney. 5 Jul 79, 3p Rept no. SAM-TR-70-357
Pub. in American Jnl. of Psychiatry, v137 n1 p115-116 Jan 80. Presented at the Annual Conference (24th) of Air Force Behavioral Scientists, School of Aerospace Medicine, Brooks Air Force Base, TX, 23-25 May 77.

No abstract available.

AD-A083 182/6 Not available NTIS
National Research Council of Canada Halifax (Nova Scotia) Atlantic Regional Lab
Terphenyllin, A Novel p-Terphenyl Metabolite from Aspergillus Candidus,
R. Marchili, and L. C. Vining. 14 Feb 75, 5p Rept no. NRCC-14509
Availability: Pub. in Jnl. of Antibiotics, v28 n4 p328-331 Apr 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 184/2 Not available NTIS
Defence Research Establishment Suffield Ralston (Alberta)
Ethanol Potentiation of Choline, Acetylcholine, Carbachol and Phenyltrimethylammonium Contractions in the Chick Biventer Cervicis Muscle.
Technical paper,
John G. Clement. 20 Nov 79, 4p Rept no. DRES-TP-505
Availability: Pub. in European Jnl. of Pharmacology, v61 p195-198 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 483/8 PC **A03/MF A01**
Foreign Technology Div Wright-Patterson AFB OH
Aethaperazinum,
G. N. Pershina. 2 Nov 79, 47p Rept no. FTD-ID(RS)T-1427-79
Unedited machine trans. of Novyye Lekarstvennyye Sredstva (USSR) n11 p146-167 1968.

No abstract available.

AD-A083 561/1 PC **A02/MF A01**
Army Medical Research Inst of Infectious Diseases Frederick MD
Ribavirin Treatment of Toga-, Arena- and Bunyavirus Infections in Subhuman Primates and Other Laboratory Animal Species,
Edward L. Stephen, Dennis E. Jones, Clarence J. Peters, Gerald A. Eddy, and Peter S. Loizeaux. Sep 79, 17p

Ribavirin was effective in reducing viremia and increasing the number of survivors compared to untreated monkeys infected with Rift Valley fever (a bunyavirus), Lassa or Machupo (both arenaviruses) viruses. Treatment was effective when given initially at the time of virus inoculation or later, after the onset of viremia and fever. Only minimal effect was evident against yellow fever virus (a flavivirus) infection in rhesus monkeys, even when treatment was initiated within 8 hours after virus inoculation. Ribavirin was ineffective against Chikungunya virus (an alphavirus) infection of monkeys. The apparent inability of ribavirin to achieve effective concentrations in the central nervous system may limit its usefulness against viruses causing primary encephalitis. (Author)

PB80-182611 PC **A05/MF A01**
Food and Drug Administration, Rockville, MD. Office of Planning and Evaluation.
An Analysis of Prescription Drug Recall Rates.
Final rept. 1974-78,
Arthur E. Hass, Jr. Apr 80, 93p FDA/ACPE-80/61, OPE-STUDY-52

This study examines a variety of product and manufacturer characteristics of prescription drugs which were recalled by their manufacturers or distributors for health-related defects. The analysis seeks to determine if prescription drugs with specific product or manufacturer characteristics have different rates of recall. The study covers recalls of multisource therapeutically equivalent prescription drugs during the period of July 1, 1973 to September 30, 1978. The product and manufacturer characteristics examined in this study are ones that the physician, pharmacist or the consumer may be aware or have influence over when selecting a prescription drug product.

PB80-185366 CP **T03**
Food and Drug Administration, Rockville, MD. Drug Listing Branch.
National Drug Code Directory Data File.
Data file,
Bruce Byer, and Fred Goetze. 2 May 80, mag tape FDA/BD-80/68, FDA/DF-80/001
Supersedes NTISUB/E/037.
Source tape in in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

Reel 009571 is standard 6250 BPI tape which contains 248,317 variable length records. There are 4 record types: (1) type 1 records contain basic information including the NDC, trade name, labeler, route of administration, dose form, etc; (2) Tvpe 2 records contain information about packaging such as package code, type and size; (3) Type 3 records contain information about ingredient. The printed directory includes a maximum of 3 ingredients. The data tape includes all active ingredients; (4) Type 4 records contain information about the drug class.

6P. Physiology

AD-A083 211/3 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Body Cooling after Death,
L. A. Kuehn, P. Tikuisis, S. Livingstone, and R. Limmer. 28 Apr 79, 10p Rept no. DCIEM-PUB-79X12
Availability: Pub. in Canadian Society of Forensic Science Jnl., v12 n4 p153-162 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 217/0 Not available NTIS
Flying Personnel Research Committee London (England)
Visual - Vestibular Interaction in the Control of Eye Movement,
G. R. Barnes, A. J. Benson, and A. R. J. Prior. 1978, 10p Rept no. FPRC/1370
Availability: Pub. in Aviation, Space, and Environmental Medicine, v49 n4 p557-564 Apr 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 409/3 PC **A02/MF A01**
Aerospace Medical Research Lab Wright-Patterson AFB OH
Effects of Infrasound on Cognitive Performance,
C. Stanley Harris, and Daniel L. Johnson. 1978, 6p Rept no. AMRL-TR-77-51
Pub. in Aviation, Space, and Environmental Medicine, v49 n4 p582-586 Apr 78.

No abstract available.

AD-A083 506/6 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
Stochastic Description of Inert Gas Exchange.
Medical research progress rept.,
P. K. Weathersby, E. E. P. Barnard, L. D. Homer, and K. G. Mendenhall. 28 Dec 78, 10p Rept no. NMRI-79-96
Pub. in Jnl. of Applied Physiology, v47 n6 p1263-1269 1979.

No abstract available.

AD-A083 576/9 PC **A05/MF A01**
Wayne State Univ Detroit MI Ergonomics Research Lab
A Technique for Establishing True Levels of Muscle Strength Exertion.
Final rept. 1 Jun 79-31 Jan 80,
K. H. E. Kroemer, and W. S. Marras. Jan 80, 83p
AFOSR-TR-80-0263
Contract F49620-79-C-0109

Experiments were performed with 20 female and 20 male subjects in order to determine indicators of whether the subjects performed maximal or submaximal isometric strength exertion. The exertion tested were elbow flexion, finger flexion, knee flexion and knee extension. The only performance measures used were analog recordings of the strength scores exerted on a static dynamometer. The following was found: (1) The variability of tests scores in repeated exertion is not a viable indicator of the actual portion of individual strength exerted. (2) The buildup phase of strength exertion is a reliable indicator of the force level to be attained. The steeper the strength formation curve, the stronger the following muscle strength exertion. (Author)

6Q. Protective Equipment

AD-A083 216/2 Not available NTIS
Flying Personnel Research Committee London (England)
Operational Characteristics of Liquid Conditioned Suits,
M. H. Harrison, and A. J. Belyavin. Jun 78, 13p Rept no. FPRC/1367
Availability: Pub. in Aviation, Space, and Environmental Medicine, v49 n8 p994-1003 Aug 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 219/6 Not available NTIS
Flying Personnel Research Committee London (England)
Prediction of Body Temperatures during Exercise in Flying Clothing,
A. J. Belyavin, T. M. Gibson, D. J. Anton, and P. Truswell. Mar 79, 10p Rept no. FPRC/1378
Availability: Pub. in Aviation, Space, and Environmental Medicine, v50 n9 p911-916 Sep 79 (No copies furnished by DTIC/NTIS).

No abstract available.

6R. Radiobiology

AD-A083 316/0 PC **A03/MF A01**
Defense Nuclear Agency, Kirtland AFB NM
EMP Facilities Interaction.
Final rept. Oct-Dec 79,
Loran E. Rhine. 1 Mar 80, 47p Rept no. FC/EFI-1

Electromagnetic Interaction of EMP facilities on Kirtland AFB was investigated and evaluated. Personnel safety from a physiological viewpoint is addressed and energy comparisons made. (Author)

AD-A083 411/9 Not available NTIS
Queen Elizabeth Coll London (England) Dept of Physics
The Role of Water in Microwave Absorption by Biological Material with Particular Reference to Microwave Hazards,
A. W. J. Dawkins, N. R. V. Nightingale, G. P. South, R. J. Sheppard, and E. H. Grant. 30 Nov 78, 10p
Grant N00014-77-G-0075
Abstract in French and German.
Availability: Pub. in Physics in Medicine and Biology, v24 n6 p1168-1176 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 571/0 PC **A02/MF A01**
University of Western Ontario London Dept of Biochemistry

Tissue Culture Modelling of Microwave Induced Cataracts of the Eye Lens.
Annual summary rept. 1 Sep 78-31 Aug 79,
John R. Trevithick. Aug 79, 15p
Grant DAMD17-78-G-9449

Intact rat lenses incubated in Medium 199 (M199) at 35.5 maintain their transparency for at least 9 days. When heated to various temperatures for 1 hour to model cataractogenesis by elevated temperatures, followed by 47 hours at 35.5 C, some lenses developed cataractous opacities, depending on the temperature of incubation. At 39 C slight globular degeneration of fiber cells appeared, localized in the equatorial region, with globules up to 20 microns in diameter as has been reported for glucose-induced cataracts. At 41 C the globular degeneration was deeper at the equatorial region, extending towards the nucleus and extended to the anterior and posterior of the lens. At 47 C and 50 C some very large globules were formed (ca 200 microns across) and the globular degeneration was more extensive. At higher temperatures (60 C) lenses did not become opaque. They had normal transparency and acuity, perhaps because they had been fixed, by a process similar to histological fixation. The morphological appearance of such lenses examined by scanning electron microscopy (SEM) was normal. D-alpha-tocopherol acetate (Vitamin E) when added to lenses before incubation at 41 C, prevented the globular degeneration observed at this temperature. These results indicate that the intact rat lens in M199 appears much more sensitive to elevation in temperature than does the lens in vivo.

BNL-26958 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
DNA Repair in Mammalian Cells Exposed to Combinations of Carcinogenic Agents.
R. B. Setlow, and F. E. Ahmed. 1979, 24p
CONF-791161-1
Contract EY-76-C-02-0016
10. international symposium of the Princess Takamatsu cancer research fund, Tokyo, Japan, 13 Nov 1979.

Cells defective in one or more aspects of repair are killed and often mutagenized more readily than normal cells by DNA damaging agents, and humans whose cells are deficient in repair are at an increased carcinogenic risk compared to normal individuals. The excision repair of uv induced pyrimidine dimers is a well studied system, but the details of the steps in this repair system are far from being understood in human cells. We know that there are a number of chemicals that mimic uv in that normal human cells repair DNA damage from both these agents and from uv by a long patch excision repair system, and that xeroderma pigmentosum cells defective in repair of uv are also defective in the repair of damage from these chemicals. The chemicals we have investigated are AAAF, 4-NQO, DMBA-epoxide, and ICR-170. We describe experiments, using several techniques, in which DNA excision repair is measured after treatment of various human cell strains with combinations of uv and these agents. If two agents have a common rate limiting step then, at doses high enough to saturate the repair system, one would expect the observed repair after a treatment with a combination of agents to be equal to that from one agent alone. Such is not the case for normal human or excision-deficient XP cells. In the former repair is additive and in the latter repair is usually appreciably less than that observed with either agent alone. Models that attempt to explain these surprising results involve complexes of enzymes and cofactors. (ERA citation 05:014300)

CEGB-RD/B/N-4440 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Individual and Collective Doses Associated with the Transport of Irradiated Magnox Fuel within the UK.
H. F. Macdonald, and J. H. Mairs. Dec 78, 26p
U.S. Sales Only.

A method is described of evaluating the individual and collective doses arising during the transport of irradiated fuel from a system of nuclear power stations to a central reprocessing plant. The doses associated with irradiated Magnox fuel movements in the UK are estimated and compared with those resulting from other phases of the nuclear fuel cycle. In addition, the individual and collective doses implied by the accidental activity release limits contained within the 1973 IAEA Tranport Regulations are discussed. (Atomindex citation 10:463375)

COO-2814-5 PC **A02**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Dept. of Biochemistry.
Molecular Basis for the Mutagenic and Lethal Effects of Ultraviolet Irradiation. Research Accomplishments (1968 to Present).
L. Grossman. 1978, 13p
Contract EY-76-S-02-2814

Earlier work on the chemical basis of mutagenesis led to certain chemical generalities sufficient to explain how certain mutagens such as uv light and hydroxylamine functioned in information transfer systems (replicative, transcriptive and translational). When such modifications were applied to biologically active DNA in a controlled manner biological expression was non-stoichiometric because much of the damage was removed from the DNA by repair systems. Our efforts were then directed to these systems which led to: (1) the isolation, purification and characterization of endonucleases responsible for the first and controlling step in DNA repair - referred to as incision in both M. luteus and E. coli. The biological role of these enzymes was inferred in appropriate mutants; (2) the isolation, purification and characterization of exonucleases responsible for the removal or excision of damaged nucleotides in M. luteus and human placental trophoblasts; (3) the repair of uv damaged biologically active transforming and transfecting DNAs by purified endonucleases, exonucleases, DNA polymerase I and polynucleotide ligase from M. luteus and E. coli; (4) the characterization of the dual gene control for incision phenomenon in M. luteus and E. coli; and (5) isolation, purification and characterization of repair enzymes from human placenta (currently in progress). (ERA citation 05:014305)

IDO-1570-T32 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Recommended Standards for gamma-Ray Energy Calibration (1979).
R. G. Helmer, P. H. M. Van Assche, and C. Van Der Leun. 1979, 20p
Contract EY-76-C-07-1570

A consistent set of gamma -ray energies, all with uncertainties of at most 10 ppM, is recommended for use in the energy calibration of gamma -rays spectra. The gamma rays listed are all from commercially available sources. The half-lives of the isotopes selected are generally at least 30 days. The gamma -ray energies, in the range E/sub gamma / = 60 to 6100 keV, are all based on the value of 411 804.4 +- 1.1 eV for the gamma ray from the decay of exp 198 Au. The energy of the 6129-keV line in exp 16 O, which is the gamma ray with the highest energy of the present set, was also measured relative to another standard; the two values are consistent. 2 figures, 2 tables. (ERA citation 05:014522)

INIS-mf-4161 PC **A03**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
National Standards of Ionizing Radiations Maintained at BARC, Trombay, Bombay : Part II - Radioactivity Standards.
U. C. Gupta, P. K. Srivastava, M. G. Shahani, and S. C. Misra. 1977, 43p CONF-771183-1
Meeting on working standards, New Delhi, India, 21 Nov 1977.
U.S. Sales Only.

The standards of radionuclides and neutron sources and methods used for standardization are described. Their international intercomparison is discussed briefly. Facilities set up at the Bhabha Atomic Research Centre, Bombay, for calibrating radiation monitors and other detectors are mentioned. (Atomindex citation 09:376253)

INIS-mf-4405 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Radiation Sterilization of Vitamins - Studies on the Radiolysis and Radiation Protection of Vitamins in Aqueous Systems and the Solid State.
K. N. Rao, P. N. Moorthy, and K. Kishore. 1978, 24p
U.S. Sales Only.

TL. (Atomindex citation 09:404840)

LBL-10383 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
BEIR-III Report and the Health Effects of Low-Level Radiation.
J. I. Fabrikant. Jan 80, 30p CONF-800111-2
Contract W-7405-ENG-48
Annual conference of the American Association for the Advancement of Science, San Francisco, CA, USA, 4 Jan 1980.

The present BEIR-III Committee has not highlighted any controversy over the health effects of low-level radiation. In its evaluation of the experimental data and epidemiological surveys, the Committee has carefully reviewed and assessed the value of all the available scientific evidence for estimating numerical risk coefficients for the health hazards to human populations exposed to low levels of ionizing radiation. Responsible public awareness of the possible health effects of ionizing radiations from medical and industrial radiation exposure, centers on three important matters of societal concern: (1) to place into perspective the extent of harm to the health of man and his descendants to be expected in the present and in the future from those societal activities involving ionizing radiation; (2) to develop quantitative indices of harm based on dose-effect relationships; such indices could then be used with prudent caution to introduce concepts of the regulation of population doses on the basis of somatic and genetic risks; and (3) to identify the magnitude and extent of radiation activities which could cause harm, to assess their relative significance, and to provide a framework for recommendations on how to reduce unnecessary radiation exposure to human populations. The main difference of the BEIR Committee Report is not so much from new data or new interpretations of existing data, but rather from a philosophical approach and appraisal of existing and future radiation protection resulting from an atmosphere of constantly changing societal conditions and public attitudes. (ERA citation 05:016792)

NUREG/CR-1419 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Cost-Benefit Effects of Conversion to SI Units in Health Physics,
Geoffrey G. Eichholz, John W. Poston, Myron F. Fair, and John A. Auxier. May 80, 49p ORNL/NUREG-68
Contract W-7405-eng-26
Prepared in cooperation with Georgia Inst. of Tech., Atlanta. School of Nuclear Engineering.

To evaluate the potential hazards associated with the introduction of new units for dose, activity and exposure, a study has been conducted to identify areas of concern. Three types of questionnaires have been sent to health physicists, professionals in nuclear medicine and the nuclear instrument industry. There is widespread opposition to the changes and a high proportion of the respondents anticipate hazards to patients and personnel during the transition period. No numerical estimate could be obtained for the actual magnitude of this risk, which is largely associated with relearning lapses and fatigue. Nevertheless, since it is anticipated that the change-over SI units will be mandatory, a rapid change-over period is advocated to minimize confusion, accompanied by conversion of digital instruments and intensive familiarization procedures, such as seminars and official publications containing conversion data.

NUREG/CR-1427 PC **A04**/MF **A01**
California Univ., Davis. Lab. for Energy-Related Health Research.
Effect of Dose Rate in Altering Immunohematologic Factors in Mammals.
Preliminary rept.,
Moshe Shifrine, and Floyd D. Wilson. Apr 80, 73p

There is an urgent need to confirm the comparative effectiveness of chronic low level radiation in

an experimental model in order to generate data that will enable regulatory agencies to establish standards for permissible exposures. Data from our initial study using exposure rates of 0.7 R/day and 0.33 R/day compared to higher rates (1, 2, 4 and 11 R/day) have suggested that only at the higher exposure rates and from cumulative exposures over 1000 R can any effects on the immunohematologic system be observed. The proposed continuation of studies will allow the authors to measure with very sensitive techniques (shown to detect meaningful changes at higher doses) any changes in immunohematology due to low level exposure rates to cumulative totals of 75 and 375 R. The authors could then state, based on experimental results, whether in fact these exposures are proportionally deleterious or not. In addition, the continuation of these studies will permit us to correlate early changes in immunohematological parameters with late effects; i.e., leukemia.

PB80-174956 PC **A03**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
Quantitative Analysis of the Reduction in Organ Doses in Diagnostic Radiology by Means of Entrance Exposure Guidelines.
Final rept.,
Priscilla W. Laws, and Marvin Rosenstein. Feb 80, 29p FDA/BRH-80/58, DHEW/PUB/FDA-80-8107
Prepared in cooperation with Dickinson Coll., Carlisle, PA.

Reductions in organ dose for entrance exposure guidelines set at the seventy-fifth percentile were computed, using observed distributions for the eight radiographic projections in the Bureau of Radiological Health's Nationwide Evaluation of X-Ray Trends. Exposure guidelines for these projections, when accompanied by an optimum quality assurance program, could reduce the average exposures falling in the fourth quartile by 57 to 70 percent, with corresponding average organ dose reductions of 47 to 68 percent. Dose reductions greater than 50 mrad (0.5 mGy) per exposed film are projected for at least one organ for all but one projection. The larger dose reductions were for the AP Thoracic Spine projection - lungs, 280 mrad (2.8 mGy); breasts, 590 mrad (5.9 mGy) - and the AP Full Spine projection - thyroid, 230 mrad (2.3 mGy); breast, 210 mrad (2.1 mGy).

UCID-18222-78 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Sperm Shape Abnormalities Induced by Energy-Related Hydrocarbons and Industrial Chemicals. EPA-1AG-D6-E681-AN, Progress Report, July 1, 1978-December 31, 1978.
A. J. Wyrobek. 23 Jul 79, 13p
Contract W-7405-ENG-48

Progress is reported in the following subject areas: changes in murine sperm head dimensions induced by low doses of x-irradiation; genetic differences in the induction of abnormal sperm with polycyclic hydrocarbons; the role of aryl hydrocarbon hydroxylase in mice; the effects of a direct acting alkylatins agent on rabbit semen. (ERA citation 05:016875)

6S. Stress Physiology

AD-A083 087/7 Not available NTIS
Flying Personnel Research Committee London (England)
Considerations of Vision and Cerebral Function during Hypotension,
A. N. Nicholson. 1975, 5p Rept no. FPRC/1342
Availability: Pub. in Aviation, Space, and Environmental Medicine, v46 n8 p996-999 Aug 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 088/5 Not available NTIS
Flying Personnel Research Committee London (England)
Respiration during Heat Stress,
Craig Saxton. 1974, 7p Rept no. FPRC/1346
Errata included.
Availability: Pub. in Aviation, Space and Environmental Medicine, v46 n1 p41-46 Jan 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 186/7 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Effect of a Local Cold Stress on Peripheral Temperatures of Inuit, Oriental, and Caucasian Subjects,
S. D. Livingstone, J. Grayson, L. D. Reed, and D. Gordon. 3 Feb 78, 6p Rept no. DCIEM-PUB-77X58
Prepared in cooperation with Toronto Univ. (Ontario). Dept. of Physiology. Summary in French.
Pub. in Canadian Jnl. of Physiology and Pharmacology, v56 n5 p877-881 1978 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 187/5 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Real-Time Decompression Monitoring by Computers,
R. Y. Nishi. 1977, 14p Rept no. DCIEM-PUB-78X10
Availability: Pub. in Hyperbaric Diving Systems and Thermal Protection, OED-v6 p25-38, n.d. (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 188/3 Not available NTIS
Toronto Univ (Ontario) Dept of Otolaryngology
Vestibulocochlear Dysfunction in Squirrel Monkeys in Simulated Diving Experiments,
J. P. Landolt, K. E. Money, E. D. L. Topliff, K. D. Powers, and W. H. Johnson. 1977, 5p DCIEM-PUB-77X22
Grant N00014-76-G-0046
Availability: Pub. in Medecine Aeronautique et Spatiale, Medecine Subaquatique et Hyperbare, n64 p377-381 1977 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 210/5 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
The Physiological Cost of Carrying Light and Heavy Loads,
W. S. Myles, and P. L. Saunders. 20 Jul 79, 7p Rept no. DCIEM-PUB-79X4
Availability: Pub. in European Jnl. of Applied Physiology and Occupational Physiology, v42 p125-131 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 212/1 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Development of 'Sports Anemia' in Physically Fit Men after Daily Sustained Submaximal Exercise,
M. W. Radomski, B. H. Sabiston, and P. Isoard. 1980, 5p Rept no. DCIEM-PUB-79X17
Presented at the Annual Meeting (50th) of the Aerospace Medical Association, May 79.
Availability: Pub. in Aviation, Space and Environmental Medicine, v51 n1 p41-45 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 213/9 Not available NTIS
Defence and Civil Inst of Environmental Medicine Downsview (Ontario)
Measurement of Skin Temperatures of Active Subjects by Wireless Telemetry.
Technical note,
R. Higgins, A. Buguet, and L. Kuehn. 1978, 3p Rept no. DCIEM-PUB-78X10
Availability: Pub. in Aviation, Space, and Environmental Medicine, v49 n11 p1352-1354 Nov 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 407/7 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Analysis of Exercise-Induced R-Wave Amplitude Changes in Detection of Coronary Artery Disease (CAD) in Asymptomatic Men with Left Bundle Branch Block,
Gregory S. Uhl, and J. Andrew C. Hopkirk. 14 Mar 79, 6p Rept no. SAM-TR-79-261
Pub. in American Jnl. of Cardiology, v44 p1247-1250 Dec 79.

No abstract available.

AD-A083 410/1 PC **A02**/MF **A01**
Systems Research Labs Inc Dayton OH
Rhesus Brain Gas Tension and Learned Task Performance Responses to Normoxic and Hyperoxic Breathing,
Alva A. Karl, Sharon L. Ward, Marvin E. Souder, Gary L. Causer, and Abbott T. Kissen. 1980, 5p AMRL-TR-79-105
Contract F33615-76-C-5001
Pub. in Aviation, Space, and Environmental Medicine, v51 n4 p352-355 Apr 80. Presented at the Annual Scientific Meeting, Aerospace Medical Association, 14-17 May 79, Washington, DC.

No abstract available.

AD-A083 504/1 PC **A02**/MF **A01**
State Univ of New York At Buffalo Dept of Physiology
Influence of Increased Gas Density and External Resistance on Maximum Expiratory Flow.
Medical research progress rept.,
J. Vorosmarti, Jr. Apr 78, 11p NMRI-79-95
Contract N00014-71-C-0342
Pub. in Undersea Biomedical Research, v6 n4 p339-346 Dec 79.

No abstract available.

N80-21959/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Immobilization Stress on the Level of Macroergic Phosphates in the Blood of Rats.
V. I. Pudov, and V. A. Sosenkov. Mar 80, 7p NASA-TM-76021
Contract NASW-3199
Transl. into English from Patol. Fiziol. Eksp. Ter. (USSR), No. 5, 1977 p 73-75. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The effect of immobilization for 1, 2, and 24 hours, and of daily (for 2 hours for 7 days) immobilization on the blood nucleotide (ATP, ADP, AMP) level was studied on 79 male rats. A progressive reduction of the ATP content was most pronounced in immobilization for 24 hours. This was accompanied by an increase of lymphopenia and eosinopenia. A fall of the relative weight of the thymus and a weight gain of the adrenal glands was observed along with a reduction of ascorbic acid concentration in both of them. In case of daily immobilization for 2 hours, the ATP and ADP content on the 1st and 2nd day was below the normal level, and then showed a gradual increase, with complete normalization in 6-7 days, except for inorganic phosphorus the level of which remained lower than normal.

N80-21960/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Tranquilizers on Animal Resistance to the Adequate Stimuli of the Vestubular Apparatus.
Y. B. Maksimovich, and N. V. Khinchikashvili. Mar 80, 9p NASA-TM-76109
Contract NASW-3198
Transl. Into English from Farmakol. Tokaikol. (USSR), V. 42, No. 6, Jun. 1979 p 606-610. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The effect of tranquilizers on vestibulospinal reflexes and motor activity was studied in 900 centrifuged albino mice. Actometric studies have shown that the tranquilizers have a group capacity for increasing animal resistance to the action of adequate stimuli to the vestibular apparatus.

N80-21961/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.

Effects of Immobilization Articular Cartilage: Autohistoradiographic Findings with S35.
C. Digiovanni, and E. Desantis. Mar 80, 33p NASA-TM-76070
Contract NASW-3199
Transl. into English from Arch. Putti Chir. Organi Movimento (Italy), V. 28, 1977 p 23-47. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original Document Prepared by Catholic Univ., Rome.

The effect of immobilization on the articular cartilage of rabbits was studied by light microscope. The knee joint of each rabbit was immobilized in a plaster in a position midway between flexion and extension for a 10 to 120 days period. Degenerative changes in the articular cartilage of increasing severity were observed. The fixation of the labeled SO4 by cartilage cells was decreased in advanced immobilization.

N80-21963/7 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Effects of Motor Patterns on Water-Soluble and Membrane Proteins and Cholinesterase Activity in Subcellular Fractions of Rat Brain Tissue.
L. Z. Pevzner, L. Venkov, and L. Cheresharov. Apr 80, 9p NASA-TM-76115
Contract NASW-3198
Transl. Into English from Ukr. Biokhim. Zh. (USSR), V. 50, No. 1, 1978 p 20-24. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Acad. Of Sci., Leningrad and Bulgarian Acad. Of Sci., Sofia.

Albino rats were kept for a year under conditions of daily motor load or constant hypokinesia. An increase in motor activity results in a rise in the acetylcholinesterase activity determined in the synaptosomal and purified mitochondrial fractions while hypokinesia induces a pronounced decrease in this enzyme activity. The butyrylcholinesterase activity somewhat decreases in the synaptosomal fraction after hypokinesia but does not change under the motor load pattern. Motor load causes an increase in the amount of synaptosomal water-soluble proteins possessing an intermediate electrophoretic mobility and seem to correspond to the brain-specific protein 14-3-2. In the synaptosomal fraction the amount of membrane proteins with a low electrophoretic mobility and with the cholinesterase activity rises. Hypokinesia, on the contrary, decreases the amount of these membrane proteins.

N80-21964/5 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
The Effects of Restraint on Uptake of Radioactive Sulfate in the Salivary and Gastric Secretions of Rats with Pyloric Ligation.
J. A. Chayvialle, R. Lambert, and D. Ruet. Mar 80, 9p NASA-TM-76073
Contract NASW-3198
Transl. Into English from Comt. Rend. Soc. Biol. (France), V. 166, No. 1, 1978 p 114-118. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The effects of restraint on the amount of nondialysable radioactive sulfate in the gastric wall and the gastric juice and saliva were investigated. It was found that restraint provokes a significant decrease in salivary radioactive sulfate. This, in turn, is responsible for the decrease of sulfate in the gastric contents observed under these conditions in rats with pyloric ligation. Esophageal ligation associated with this prevents passage of saliva and lowers the amount of radioactive sulfate in the gastric juice. Restraint causes then an increase in the amount of sulfate in the gastric juice, the value observed being very much lower than that of rats with a free esophagus. At the level of the gastric wall, the change observed during restraint does not reach a significant threshold.

N80-21966/0 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Changes of Gas Metabolism, Gas Homeostatis and Tissue Respiration in Rats During Prolonged Hypokinesia.
V. L. Popkov, E. S. Mailyan, Y. S. Galusko, Y. A. Kovalenko, and Y. I. Zaytseva. Dec 79, 10p NASA-TM-75982
Contract NASW-3198
Transl. Into English from Fiziol. Zh. Sssr (USSR), V. 66, No. 12, 1970, p 1808-1812.

The oxygen uptake and tissue gas homeostasis of restrained albinic rats remained relatively constant during a 60 day experiment. The gas metabolism in some tissues changed, and O2 consumption increased in the liver and decreased in the myocardium. Capacity for physical work was reduced by five times. Hypokinesia for 60 days resulted in a delay in the animals growth.

N80-21968/6 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Metabolism and Activity of Zoxazolamine in White Rats During Forced Immobilization with and Without Hyperthermia.
L. Buchel, and M. Murawsky. Mar 80, 24p NASA-TM-76074
Contract NASW-3198
Transl. Into English from Arch. Sci. Physiol. (France), V. 27, 1973 p 37-53. Transl. By Scientific Translation Service, Santa Barbara. Calif.

The influence of restraint of rats held either at normal body temperature or at lowered body temperature as related to the effects of the muscle relaxant zoxazolamine was studied. The techniques used and experimental results obtained are presented.

N80-21971/0 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Age Related Changes in the Bone Tissue under Conditions of Hypokinesia.
E. P. Podrushnyak, and E. I. Suslov. Apr 80, 7p NASA-TM-76019
Contract NASW-3199
Transl. Into English from Fiziol. Zh. (USSR), V. 9, No. 6, Nov. - Dec. 1973 p 841-843. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By USSR Academy of Medical Sciences, Kiev.

Microroentgenography of nine young people, aged 24-29, before and after hypokinesia (16-37 days strict bed rest), showed that the heel bone density of those with initially high bone density generally decreased and that of those with initially low bone density generally increased. X-ray structural analysis of the femurs of 25 corpses of accidentally killed healthy people, aged 18-70, data are presented and discussed, with the conclusion that the bone hydroxyapatite crystal structure stabilizes by ages 20 to 25, is stable from ages 25 to 60 and decreases in density after age 60. It is concluded that bone tissue structure changes, both with age, and in a comparatively short time in hypokinesia.

N80-21973/6 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Syrepar and Oxaphenamide on Liver Function in Experimental Hypokinesia.
L. N. Skakun. Jan 80, 9p NASA-TM-76011
Contract NASW-3198
Transl. Into English from Farmakol. Toksikol. (USSR), V. 41, No. 4, Jun. - Aug. 1978 p 465-469. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Ternopol Medical Inst., USSR.

Experiments on albino rats showed that 30 day hypokinesia changes the reaction of the liver to cholagogues. The choleretic action of oxaphenamide as well as its inhibitory effect on synthesis of bile acids diminishes, while the influence of bilirubin secretion increases.

N80-21974/4 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Hyperbaric Oxygenation on Carbohydrate Metabolism Protein Synthesis in the Myocardium During Sustained Hypodynamia.
G. A. Makarov. Jan 80, 9p NASA-TM-76012
Transl. Into English from Kardiologiya (USSR), V. 14, No. 2, 1974 p 73-77. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Glycolysis and the intensity of protein synthesis were studied in 140 white male rats in subcellular fractions of the myocardium during 45 day hypodynamia and hyperbaric oxygenation. Hypodynamia increased: (1) the amount of lactic acids; (2) the amount of pyruvic acid; (3) the lactate/pyruvate coefficient; and (4) the activities of aldolase and lactate dehydrogenase. Hyperbaric oxygenation was found to have a favorable metabolic effect on the animals with hypodynamia.

N80-21975/1 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, D C.
Reliability and Information Content of Tests with Cardioleader in Cyclic Types of Sports.
V. L. Utkin. Mar 80, 11p NASA-TM-76090
Contract NASW-3198
Transl. Into English from Teor. Prakt. Fiz. Kultury (USSR), No. 5, May 1979 p 10-14. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Tests with cardioleader to control the physical, technical and tactical preparedness of athletes in cyclic types of sports are discussed. Ways of increasing the reliability and information content of the tests were studied.

N80-21976/9 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Preservation of Equilibrium in Orthograde and Inverted Body Positions.
L. P. Semenov, and N. A. Rebyakova. Mar 80, 6p NASA-TM-76112
Contract NASW-3198
Transl. Into English from Teor. Prakt. Fiz. Kulture (USSR), No. 5 May 1979 p 29-30. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The mechanism for regulation of the vertical pose with retention of equilibrium in the inverted body position was investigated.

N80-21977/7 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Hazards of High Altitude Decompression Sickness During Falls in Barometric Pressure from 1 ATM to a Fraction Thereof.
A. M. Genin. Jan 80, 10p NASA-TM-76015
Contract NASW-3198
Transl. Into English of Conf. Paper from Inst. Of Med. And Biol. Problems, Min. Of Health, Moscow, 1979 p 1-12. Transl. By Scientific Translation Service, Santa Barbara, Calif. Presented at 10TH Conf. Of Joint Soviet-AM. Working Group on Space Biol. And Med., Houston, Tex., Oct. 1979.

Various tests related to studies concerning the effects of decompression sicknesses at varying pressure levels and physical activity are described. The tests indicate that there are no guarantees of freedom from decompression sicknesses when man transitions from a normally oxygenated normobaric nitrogen-oxygen atmosphere into an environment having a 0.4 atm or lower pressure and he is performing physical work.

N80-21978/5 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Main Trends in Experimental Morphological Research in Angiology and Outlook for Its Development.
N. A. Dzhavakhishvili, and Y. P. Melman. Jan 80, 10p NASA-TM-75980
Contract NASW-3198
Transl. Into English from Arkh. Anat., Gistol. Embriol. (USSR), V. 66, No. 2, 1970 p 21-25. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The main prospective trends in the problem of collateral circulation and new trends in experimental angiology with respect to the effect of gravitational forces, hypodynamia and hypokinesia on the vascular bed are discussed.

6T. Toxicology

AD-A083 044/8 PC **A02/MF A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground MD

Topical Hazard Evaluation Program of Candidate Insect Repellent AI3-70820-Ga, US Department of Agriculture Proprietary Compound, August 1979 - January 1980.
Final rept. Aug 79-Jan 80,
Allen W. Singer. 24 Mar 80, 10p Rept no. USAEHA-75-51-0230-80

A preliminary hazard evaluation of AI3-70820-Ga was performed by means of laboratory animal studies using rats, rabbits, and guinea pigs. The technical grade compound caused mild primary skin irritation and mild corneal irritation. It did not cause any photoirritation, did not sensitize guinea pigs, and did not prove to be an acute ingestion hazard. It was recommended that AI3-70820-Ga, US Department of Agriculture Proprietary Compound, be approved for further testing as a candidate insect repellent. (Author)

AD-A083 349/1 Not available NTIS
Army Medical Research Inst of Infectious Diseases Frederick MD
The Secondary Structure of Staphylococcal Enterotoxins A, B and C,
John L. Middlebrook, Leonard Spero, and Patrick Argos. 22 Jun 79, 8p
Supersedes report dated 10 Apr 79, AD-A067 759.
Availability: Pub. in Biochimica et Biophysica Acta, v621 p233-240 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 350/9 Not available NTIS
Army Medical Research Inst of Infectious Diseases Frederick MD
Toxin Production by Clostridium botulinum Type A under Various Fermentation Conditions,
Lynn S. Siegel, and Joseph F. Metzger. 16 Jul 79, 6p
Supersedes report dated 15 May 79, AD-A068 789.
Availability: Pub. in Applied and Environmental Microbiology, v38 n4 p606-611 Oct 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 408/5 Not available NTIS
Army Medical Research Inst of Infectious Diseases Frederick MD
Enterotoxin B Formation by Fermentation Mutants of Staphylococcus aureus,
Robert A. Altenbern. 3 Jun 75, 8p
Availability: Pub. in Canadian Jnl. of Microbiology, v22 n2 p182-188 1976 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 563/7 PC **A02**/MF **A01**
Army Medical Research Inst of Infectious Diseases Frederick MD
Staphylococcal Enterotoxin A (SEA).
Interim rept.,
Leonard Spero, and Joseph F. Metzger. 28 Feb 80, 14p

The staphylococcal enterotoxins, a group of water-soluble exoproteins elaborated by certain strains of Staphylococcus aureus, produce an acute gastroenteritis in man and a small number of other mammalian species. There are five well-defined types, A, B, C, D and E, originally identified on the basis of serologic individuality. Serologic cross-reaction has, however, been found between types A and E. Two cross-reacting determinants have been demonstrated in types B and C and indeed some antisera show cross-immunoprecipitation between these two types. The mode of action of these enterotoxins is unknown, but it does not appear that the adenyl cyclase-adenosine monophosphate system is involved. In addition to their emetic activity, the staphylococcal enterotoxins have also been demonstrated to be polyclonal mitogens for mouse and human splenic lymphocytes. The stimulation is essentially limited to T-cells; types A, B and C are equipotent. Recently, Johnson and coworkers have shown that enterotoxin A (SEA) stimulates the production of interferon of the immune type in both splenic and peripheral lymphocytes. The conditions for this production of human and mouse interferon are described elsewhere in this volume. (Author)

BNL-27210 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Effects of Acidity on Primary Productivity in Lakes: Phytoplankton.
G. R. Hendrey. 1979, 37p CONF-791090-5
Contract EY-76-C-02-0016
Symposium on potential environmental and health effects of atmospheric sulfur deposition, Gatlinburg, TN, USA, 14 Oct 1979.

Relationships between phytoplankton communities and lake acidity are being studied at Woods Lake (pH ca. 4.9), Sagamore Lake (pH ca. 5.5), and Panther Lake (pH ca. 7.0). Numbers of phytoplankton species observed as of July 31, 1979 are Woods 27, Sagamore 38, and Panther 64, conforming to other observations that species numbers decrease with increasing acidity. Patterns of increasing biomass and productivity found in Woods Lake may be atypical of similar oligotrophic lakes in that they develop rather slowly instead of occuring very close to ice-out. Contributions of netplankton (net > 48 mu m), nannoplankton (48 > nanno > 20 mu m) and ultraplankton (20 > ultra >0.45 mu m) to productivity per m exp -2 show that the smaller plankton are relatively more important in the more acid lakes. This pattern could be determined by nutrient availability (lake acidification leading to decreased availability of phosphorus). The amount of exp 14 C-labelled dissolved photosynthate (exp 14 C-DOM), as a percent of total productivity, is ordered Woods > Sagamore > Panther. This is consistent with a hypothesis that microbial heterotrophic activity is reduced with increasing acidity, but the smaller phytoplankton may be more leaky at low pH. (ERA citation 05:016853)

CONF-800223-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Integrated Approach to Chemical-Biological Analysis.
M. R. Guerin. 1980, 16p
Contract W-7405-ENG-26
Symposium on process measurements for environmental assessment, Atlanta, GA, USA, 25 Feb 1980.

Environmental and health assessments are increasingly dependent on the results of biological testing. Biological testing, in turn, is becoming increasingly dependent on physical and chemical assistance to achieve reliable and interpretable results. A currently common interaction between disciplines has been termed the matrix approach. Contributing groups maintain their disciplinary focus but generate data or materials needed by other groups to reach a mutual programmatic objective. A more intimate interaction occurs as the contributing groups focus more completely on the program objectives. Further integration occurs as the fundamental issues of delivery and dosimetry are addressed. The most effective approach to an integrated chemical-biological program requires that each of the levels of interaction be present and that the collaborating groups give the programmatic objective as much attention as is given to disciplinary concerns. (ERA citation 05:016718)

CONF-800323-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Mutagenicity of Nitrogen Compounds from Synthetic Crude Oils: Collection, Separation and Biological Testing.
T. K. Rao, J. L. Epler, M. R. Guerin, B. R. Clark, and C. H. Ho. 1980, 19p
Contract W-7405-ENG-26
Symposium on the application of short-term bioassays in the fractionation and analysis of complex environmental mixtures, Williamsburg, VA, USA, 4 Mar 1980.

In order to determine the long range health effects such as carcinogenicity/mutagenicity/teratogenicity/toxicity, associated with the newly emerging energy technologies, we have utilized the Ames Salmonella assay to evaluate mutagenic properties of synthetic fuels. Coupling with class fractionation was necessary. Organic extraction and liquid/liquid partitioning was used to separate acidic and basic fraction. The neutral material was separated using Sephadex LH-20 gel filtration into saturated and aromatic fractions of various ring sizes. The alkaline fraction was subfractionated eluting with benzene and ethanol on a basic alumina column and then with isopropanol and acetone using a Sephadex LH-20 gel column. The frameshift strain TA-98 was utilized along with Aroclor-induced rat liver homogenate (S-9 mix) for the mutagenicity assay. The natural crude oils were slightly mutagenic, the polynucleararomatics constituting the activity, while the coal-derived fuels indicated mutagenicity associated with alkaline constituents as well as polyaromatics. Hydrotreated coal (H-coal, HDT) or Shale (Paraho-Shale oil, HDT) derived fuels were not mutagenic. Ninety percent of the mutagenic activity in alkaline fraction was recovered in the acetone subfraction. High resolution spectroscopy of this fraction indicates polycyclic aromatic primary amines along with azaarenes as organic constituents responsible for the mutagenic activity associated with shale- and coal-derived fuels. (ERA citation 05:016855)

CONF-800323-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Detection of Potential Genetic Hazards in Complex Environmental Mixtures Using Plant Cytogenetics and Microbial Mutagenesis Assays.
M. J. Constantin, K. Lowe, T. K. Rao, F. W. Larimer, and J. L. Epler. 1980, 25p
Contract W-7405-ENG-26
Symposium on the application of short-term bioassays in the fractionation and analysis of complex environmental mixtures, Williamsburg, VA, USA, 4 Mar 1980.

Solid wastes have been characterized to determine their potential hazards to humans and the environment. An arsenic-contaminated ground water sample increased the frequency of histidine revertants in Salmonella typhimurium (TA-98) at 0.025 to 5.000 mu l per plate with Aroclor-induced S-9 liver microsomes. When 2.5 to 75 mu l of the XAD-2 concentrate (12.5-fold, v:v) were used, the mutant frequency was increased in strains TA-98, TA-100, and TA-1537; metabolic activation was not required. Only the XAD-2 concentrate was mutagenic in the Saccharomyces cerevisiae haploid strain XL-7-10B; metabolic activation was not required. The mutagenic principal, which is not known, appears to be at the limit of resolution; hence, the XAD-2 concentration is necessary to demonstrate mutagenic activity. The arsenic-contaminated ground water (0.0625 and 0.125 dilutions) and the power plant fly ash extract (undiluted) increased the frequency of bridges and fragements at anaphase in root tip cells of Hordeum. The fly ash sample was negative in the microbial assays. Results emphasize (1) the need for a battery of assays with different organisms and (2) the potential of a simple assay using plant root tip cells to detect mutagenic activity in complex environmental mixtures. (ERA citation 05:016856)

DOE/ET/00222-2 PC **A02**/MF **A01**
Cincinnati Univ., OH. Coll. of Medicine.
Exploratory Research on Mutagenic Activity of Coal-Related Materials. Progress Report, August 1-October 31, 1979.
D. Warshawsky, and R. S. Schoeny. 1979, 11p
Contract EW-78-S-22-0222

Sample ETTM-13 (coal liquefaction untreated water) was not mutagenic under the condition of testing for strains TA1535, TA1537, TA1538, TA98 or TA100. ETTM-14 (coal liquefaction light oils) was slightly mutagenic for TA1538 and TA98 when tested with Aroclor - induced S-9. Both samples were somewhat toxic for the test organisms, particularly when no S-9 extract was present. Data included on repeat assays of ETTM-10 and ETTM-11 agreed with those previously reported. (ERA citation 05:011082)

DOE/ET/0222-2 PC **A02**/MF **A01**
Cincinnati Univ., OH. Dept. of Environmental Health.
Exploratory Research on Mutagenic Activity of Coal-Related Materials. Progress Report, November 1, 1979-February 29, 1980.
D. Warshawsky, and R. S. Schoeny. 1980, 8p
Contract EW-78-S-22-0222

Samples ETTM-15 (coal liquefaction heavy liquids with solids) and ETTM-16 (coal liquefaction product - filtered) were mutagenic for strains TA1538, TA98 and TA100 when tested with Aroclor-induced S-9. Neither sample was mutagenic under the conditions of testing for strain TA1535. (ERA citation 05:014757)

JEN-438 PC A07/MF A01
Junta de Energia Nuclear, Madrid (Spain).
Effects Pf IHN, DNP, 2,4-D and CMU on the Photosynthetic Activity of Barley and Maize Plants.
J. Fernandez Gonzalez, and M. P. Prieto Arroyo. 1979, 130p
In Spanish.
U.S. Sales Only.

Determinations of the rate of photosynthesis were made in barley and maize leaves treated with INH, DNP, 2,4-D or CMU. 1 ppm of the chemicals in nutritive solution was absorbed by roots during 24 or 48 hours in both dark and light conditions. After this period, photosyntetic activity, compensation point and exp 14 CO sub 2 assimilation were determined. Results show that INH increases the rate of photosynthesis, DNP and 2,4-D do not alter it sensibly and CMU acts as a strong inhibitor of photosynthesis. Some possible applications for the obtention of labelled compounds by biosynthesis are discused. (Atomindex citation 10:476643)

PB80-170871 PC A03/MF A01
Illinois State Water Survey, Urbana.
Acute Toxicity of Residual Chlorine and Ammonia to Some Native Illinois Fishes.
Rept. of Investigation,
Donald P. Roseboom, and Dorothy L. Richey. 1977, 48p ISWS/RI-85/77, W80-04668
Sponsored in part by Office of Water Research and Technology, Washington, DC.

Ninety-six hour residual chlorine bioassays were conducted on bluegill and channel catfish. In 96-hour acute toxicity studies with ammonia (NH3-N), bass in addition to bluegill and channel catfish, were included. The studies were performed in waters typical of most lakes and streams in midwestern states, i.e., relatively high in alkalinity and the salts of calcium and magnesium. Observations regarding the characteristics and reaction of the fishes to each toxicant were noted. For residual chlorine the 96-hour TL50s ranged from 0.18 to 0.33 mg/l for bluegill, depending on temperature and fish weight. For channel catfish the TL50 was about 0.09 mg/l; temperature was not a factor. For ammonia the 96-hour TL50s for bluegill were dependent on temperature and fish weight and varied from 0.40 to 1.3 mg/l. Size was not a factor for bass and channel catfish. Ninety-six hour TL50s for these fishes ranged from 0.72 mg/l at 22C to 1.2 mg/l at 30C for bass and 1.5 mg/l at 22C to 3.0 mg/l at 28C for channel catfish. For the protection of the fishes investigated, and consistent with the water pollution regulations of Illinois, residual chlorine in Illinois waters should not be detectable and NH3-N should not exceed a concentration of 0.04 mg/l.

PB80-175854 PC A03/MF A01
National Inst. for Occupational Safety and Health, Cincinnati, OH.
Tumors Induced in C3H/HeJ Mice by Coal Tar Neutral Subfractions.
Technical rept.,
Donald E. Richards, William P. Tolos, Jag B. Lal, and Charles V. Cooper. Nov 79, 29p DHEW/PUB/NIOSH-80-101

The biologic activity of seven coal tar neutral subfractions was investigated by repeated applications on mouse skin. Four of the subfractions induced skin tumors--identified histopathologically as squamous cell papillomas or squamous cell carcinomas--in one or more mice in their respective test groups. Pulmonary metastases from a squamous cell carcinoma of the skin were seen in one mouse. The two subfractions that induced squamous cell carcinomas were shown by gas chromatographic-mass spectrometric analyses to contain many 4- and 5-ring polynuclear aromatic hydrocarbons, some of which are known to be carcinogenic in mouse skin.

PB80-175862 PC A03/MF A01
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Surveillance, Hazard Evaluations and Field Studies.
Environmental Exposure to Airborne Contaminants in the Antimony Industry, 1975-1976.
Technical rept.,
Harry M. Donaldson, and Melvin Cassady. Aug 79, 27p DHEW/PUB/NIOSH-79-140

A study of the antimony production industry in the United States was undertaken by the National Institute for Occupational Safety and Health (NIOSH) since a study by Cunningham and McCallum of Associated Lead Manufacturing, Ltd., disclosed 17 cases of respiratory cancer during the last 10 years among antimony production workers in England. The 1975 NIOSH study involved the monitoring of three major antimony producers, two of which roast. Imported antimony sulfide ore to produce antimony oxide (Plants B and C), while the other (Plant A), the only producer of antimony metal in the United States, produces antimony oxide by the oxidation of purified antimony metal. A follow-up study on Plant A was made in 1976 to collect breathing zone samples since these were not gathered in the preliminary survey. The three plants showed antimony exposures above the current OSHA standard of 0.5 mg/cu m. The arsenic exposures although below the then current OSHA standard of 0.5 mg/cu m exceeded in most instances the current OSHA standard of 0.010 mg/cu m. Bagging operations appeared to be one of the larger air contamination sources in two of the plants. Controlling airborne antimony to 0.5 mg/cu m may possibly reduce airborne arsenic to the OSHA standard.

PB80-176407 PC A06/MF A01
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Technical Services.
Self-Evaluation Instrument -- Electric Utility Industry,
P. G. Rentos, Frank W. Godbey, Loren L. Hatch, and Edward L. Schrems. Oct 78, 104p DHEW/PUB/NIOSH-78-202
Library of Congress catalog card no. 78-600124.

So that employers and employees within the electric utility industry can more readily recognize actual or potential occupational hazards, a series of comments and self-evaluation questions applicable to this industry has been prepared. This field-tested systematic questionnaire approach covers all identifiable work areas and work situations within utilities that use fossil fuel for electric power generation. After responsible persons complete a survey and an answer the question and after the condition of all work areas is further evaluated, if necessary, those areas that need upgrading will become obvious. Because pertinent occupational safety and health standards for electric utilities are included, implementing corrective action should provide a measure of assurance that OSHA standards are being met. A companion document 'Self-Evaluation of Occupational Safety and Health Programs' gives basic information applicable to all industries and should be used with 'Self-Evaluation Instrument--Electric Utility Industry' to aid in implementing a comprehensive occupational safety and health program.

PB80-176993 PC A05/MF A01
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Criteria Documentation and Standards Development.
Criteria for a Recommended Standard: Occupational Exposure to Vinyl Acetate.
Criteria document,
Alfred N. Milbert, and Jerry Chandler. Sep 78, 89p DHEW/PUB/NIOSH-78-205

These criteria for a standard for vinyl acetate are part of a continuing series of criteria developed by NIOSH. The proposed standard applies to workplace exposure arising from the processing, manufacture, use, storage, and handling of vinyl acetate. The standard was not designed for the population-at-large, and any extrapolation beyond occupational exposures is not warranted. It is intended to (1) protect against impairment of health by vinyl acetate (2) be measurable by techniques that are valid, reproducible, and available to industry and government agencies, and (3) be attainable with existing technology. During the development of the recommended standard for occupational exposure to vinyl acetate, it became apparent that there are deficiencies in available information on (1) effects on humans and animals exposed to vinyl acetate at low levels for extended periods, (2) possible carcinogenic, mutagenic, teratogenic, or reproductive effects of vinyl acetate on animals and humans, (3) the utility of the electroencephalograph in estimating the toxic potential of vinyl acetate, and (4) sensitive analytical methods and direct-reading monitoring devices for airborne vinyl acetate.

UCRL-82566 PC A03/MF A01
California Univ., Livermore. Lawrence Livermore Lab.
Mutation Induction at Multiple Gene Loci in Chinese Hamster Ovary Cells: Comparisons of Benzo(A)Pyrene Metabolism by Organ Homogenates and Intact Cells.
J. H. Carver, E. P. Salazar, M. G. Knize, D. S. Orwig, and J. S. Felton. 7 Nov 79, 31p CONF-791059-2
Contract W-7405-ENG-48
International symposium on polynuclear aromatic hydrocarbons, Columbus, OH, USA, 2 Oct 1979.

Mutations induced by B(a)P are quantified at four gene loci in Chinese hamster ovary (CHO) cells: aprt, hgprt, tk, and ATPase. The mutants were selected by their resistance to 8-azaadenine (AA), 6-thioguanine (TG), 5-fluorodeoxyuridine (FUdR), or ouabain (OUUA). Activation by liver homogenates (S9) and liver microsomes from rats induced with Aroclor 1254, Syrian hamster embryo (SHE) cells, and kidney microsomes from male, female, and testosterone-treated female C3H/HeJ mice was compared. Finally, a comparison was made between profiles of B(a)P metabolites produced by the different activation systems and th observed mammalian mutagenesis data. Comparison of profiles of B(a)P metabolites produced by different activation systems with the observed mutagenic activity at four gene loci in a mammalian mutagenesis system showed some striking similarities but some significant differences. Although profiles of SHE-activated B(a)P represent metabolism that is more relevant to the intact cell than to disrupted cell homogenates, induced mutation levels at four separate gene loci were very similar for B(a)P activated by rate liver microsomes or SHE. Thus dissimilar activation systems may produce similar steady-state levels of the mutagenic epoxide intermediates. However, the frequencies of B(a)P mutation with S9 activation were substantially lower. Kidney microsomes from male and testosterone-treated female mice efficiently metabolized DMN, but produced insignificant amounts of B(a)P metabolites; mutation data paralleled these results. (ERA citation 05:016852)

6U. Weapon Effects

AD-A083 345/9 PC A06/MF A01
BDM Corp McLean VA
Development and Application of a Model of Fallout Shelter Stay Times.
Final rept. 15 Jun-29 Dec 78,
J. H. Kinrich, R. A. Levit, and N. J. Maresca. 29 Dec 78, 103p BDM/W-79-778-TR, DNA-4874F, AD-E300 713
Contract DNA001-78-C-0060

The Attrition Rate Model is a model of how and at what rate individuals leave fallout shelters. This document is a description of the model and the methodology used to develop it. In addition, this document serves as a user's guide to the application of the model. Two complete examples are presented--a pencil-and-paper study of fallout casualties in a representative Soviet city, and an application to a red-on-blue SIDAC scenario. The complete programs necessary to run the SIDAC post-processor are also included.

7. CHEMISTRY

7A. Chemical Engineering

AED-Conf-77-565-002 PC A03/MF A01
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Gasification with Nuclear Reactor Heat.
I. A. Weisbrodt. 1977, 27p CONF-771261-1
In German.Conference on coal gasification and hydrogenation, Essen, F.R. Germany, 7 Dec 1977.
U.S. Sales Only.

The energy-political ultimate aims for the introduction of nuclear coal gasification and the present state of technology concerning the HTR reactor, concerning gasification and heat exchanging components are outlined. Presented on the plans a) for hydro-gasification of lignite and for steam gasification of pit coal for the production of synthetic natural gas, and b) for the introduction of a nuclear heat

system. The safety and environmental problems to be expected are portrayed. The main points of development, the planned prototype plant and the schedule of the project Pototype plant Nuclear Process heat (PNP) are specified. In a market and economic viability study of nuclear coal gasification, the application potential of SNG, the possible construction programme for the FRG, as well as costs and rentability of SNG production are estimated. (Atomindex citation 09:392574)

BNL-51075 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Alternative Process Schemes for Coal Conversion. Progress Report No. 2, February 1-April 30, 1979.
M. J. Sansone. May 79, 38p
Contract EY-76-C-02-0016

The importance of gas separation methods to the economics of hydrogasification and catalytic gasification processes has been emphasized. This importance is due to the fact that these processes require large amounts of recycled hydrogen or hydrogen and carbon monoxide from which the product methane must be removed via some economical method. For example, the Exxon catalytic gasification process utilizes a cryogenic distillation to achieve the separation of CH sub 4 from H sub 2 and CO. In this report, the energetics of a cryogenic separation process for hydrogen-methane mixtures are calculated and compared with the energy requirements for the separation of H sub 2 /CH sub 4 and H sub 2 /CO/CH sub 4 mixtures using a gas hydrate separation scheme. It must be stated at the outset that the success of the proposed hydrate process depends upon the kinetics of hydrate formation for which we have no data. Nevertheless, it is still worthwhile to examine such a process within a thermodynamic framework to determine if such a scheme is at least energetically, if not kinetically, feasible. (ERA citation 05:014639)

DOE/LETC/B-79/1 PC **A11**/MF **A01**
Department of Energy, Laramie, WY. Laramie Energy Technology Center.
Economic Sensitivity Study of UCG Based on Field Performance, Theory, and Operational Experience.
J. E. Boysen, and R. D. Gunn. Nov 79, 240p

This paper provides the results of an economic analysis in which uncertainty has been minimized through the use of the following three types of information: (1) theoretical and experimental correlations of underground coal gasification (UCG) operating parameters; (2) detailed process design based on operational experience; and (3) sensitivity variables. Independent variables cannot be fixed with certainty - for example, gas heating values are known for short-term field tests but remain uncertain for a long-term commercial operation. Such variables are designated sensitivity variables and are over their entire probable range. Other sensitivity variables are percent gas loss, well spacing, and the volumetric combustion sweep efficiency (VCSE). Depth and thickness of the coal seam are also designated sensitivity variables because they are strictly site-specific. A total of 1,296 cases have been considered in order to cover a full range of all sensitivity variables. Only-dirty gas selling prices are calculated in order to avoid assumptions concerning unproven methods of gas cleanup. Results show that the seam depth/thickness ratio is the most important variable affecting the economics of UCG. Low BTU gas from a thick coal seam of moderate depth (30 ft. seam at 600 ft.) can compete with current natural gas prices on a BTU basis even under poor operating conditions such as high leakage and low heating value. Well spacing and gas heating value also have notable impacts on the economics of UCG. The gas leakage rate and VCSE affect the economic results to a lesser extent for the range of values considered. Further research is needed in optimum well spacing, methods for control of the gas heating value, gas cleanup and utilization, environmental impact, and subsidence. (ERA citation 05:012912)

FE-0496-160 PC **A05**/MF **A01**
Pittsburg and Midway Coal Mining Co., Shawnee Mission, KS.
Solvent Refined Coal (SRC) Process. Quarterly Technical Progress Report, July 1-September 30, 1978.
1978, 92p
Contract EX-76-C-01-0496

This report summarizes the progress of the Solvent Refined Coal (SRC) project by The Pittsburg and Midway Coal Mining Co. for the Department of Energy for the period July 1, 1978 through September 30, 1978. Major activities at the Fort Lewis Pilot Plant included SRC I operation and the test operation of a new type of rotary drum filter, Filter C. A period of SRC II operation using a Pittsburgh seam coal from the Powhatan No. 5 mine was initiated. Merriam Laboratory activities included testing of novel reactors and very short residence times and a study of solvent behavior at SRC II reaction conditions. The Process Development Unit P-99 at Harmarville tested a series of Pittsburgh seam coals in the SRC II process to study both feedstock effects and process variable effects. (ERA citation 05:011085)

FE-1517-57 MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
Refurbishing of the Cresap Test Center. Interim Report, May 1974-September 1977.
Aug 78, 252p
Contract EX-76-C-01-1517
Portions of document are illegible.
Microfiche copies only.

The pilot plant at Cresap, West Virginia was originally set up as a project to produce high octane gasoline from coal. The design was accomplished by the C.W. Nofsinger Company under contract to the Consolidation Coal Company, and construction was completed in 1967 by the Dravo Company. The plant operated until April, 1970. It was plagued throughout its operating life by numerous mechanical failures. Subsequent to the shutdown, an engineering survey was made by the Foster-Wheeler Corporation, who concluded that the process was technically feasible but that certain design modifications of the pilot plant were necessary to improve mechanical reliability. Fluor was awarded a contract in May, 1974 to reactivate the plant. The Consol Synthetic Fuels (CSF) process was retained as the basic design, but the target product specifications were shifted from a light synthetic crude oil to a clean liquid fuel suitable for large stationary steam boilers such as are used in the electric power generation industry The plant has been modified to incorporate an extensive testing program to establish the reliability of equipment components critical to coal liquefaction processes. This report provides a detailed analysis of the plant changes needed to meet the contractual objectives. In addition, this report contains a process description, process and mechanical flow diagrams, an equipment list, and photographs of the plant site at various stages of the construction. (ERA citation 05:012945)

FE-1743-72 PC **A04**/MF **A01**
Conoco Coal Development Co., Library, PA.
Zinc Halide Hydrocracking Process for Distillate Fuels from Coal. Quarterly Technical Progress Report, February 1-April 30, 1979.
M. Pell, C. R. Greene, J. T. Maskew, C. W. Zielke, and R. T. Struck. 29 Jun 79, 56p
Contract EX-76-C-01-1743

The Hydrocracking Section of the 1.2 TPD (45 kg/h) PDU completed a program feeding SRC-I with recycle of all +200 exp 0 C distillate. As expected from smaller-scale work, a gasoline yield of 49% was obtained, corresponding to 67% if all +200 exp 0 C were recycled to extinction. The final research octane number was down from 93 to 87, indicating that conditions were slightly too severe to produce the desired 90-92 RON. The Regeneration Section of the PDU is being revised to upgrade melt handling and is on schedule. The laboratory study of the effect of ash metal chlorides on catalyst activity concludes that the build-up of KCl, NaCl, CaCl sub 2 and FeCl sub 2 should be limited by equilibria involved to levels where the reduction of catalyst activity will be small. An economic estimate for a commercial plant making 53,000 bbl/SD (8.4 x 10 exp 6 liters/SD) of gasoline from Western coal projects gasoline costs which encourage further development of the process. (ERA citation 05:012946)

FE-2007-T1 PC **A10**/MF **A01**
Johns-Manville Sales Corp., Denver, CO.
Filtration Process and Equipment Studies for Coal Liquefaction Processes. Final Report.
I. Bastidas, R. C. Himes, F. B. Hutto, and P. Martin. May 79, 217p
Contract EX-76-C-01-2007

Precoat filtration has been used as the liquid/solid separation process at both the Pittsburg and Midway Coal Mining Company, Fort Lewis, Washington, SRC I Pilot Plant and the SRC Pilot Plant at Wilsonville, Alabama. Johns-Manville's experience from other precoat filtration operations indicated that major improvements in filtration rate and operating costs should be possible. A Rotary Pressure Precoat Filter Test Leaf was designed and constructed which makes it possible to simulate the operation of a full scale rotary pressure precoat filter. Variables affecting the operation of the rotary pressure precoat filter were investigated in detail. At optimized operating conditions, the filtration rates were three to four times those achieved at Fort Lewis and almost an order of magnitude higher than those obtained at Wilsonville on another type of filter. It now appears possible to markedly reduce the filtration cost in coal liquefaction plants. This Report includes a review of precoat filtration principles, a description of the test equipment used, and a presentation of the effect of filtration variables as determined by studies with the Rotary Pressure Precoat Filter Test Leaf. (ERA citation 05:012948)

FE-2012-075 PC **A04**/MF **A01**
Illinois Coal Gasification Group, Chicago.
Pipeline Gas Demonstration Plant. Phase I. Quarterly Technical Progress Report, June-August 1979.
R. J. Eby. Sep 79, 61p
Contract EF-77-C-01-2012

Work has continued on the Pipeline Gas Demonstration Plant Program as follows: Demonstration Plant Process Design, Site Evaluation and Selection, Demonstration Plant Environmental Analysis, Technical Support, and Project Management. Work was initiated on a Long Lead Procurement List. The following Major Contract Deliverables have been submitted to DOE: Draft Environmental Analysis Report, Tentative Long Lead Time Procurement List, and a Quality Assurance/Availability Assurance Plan. The major work effort has been directed toward the completion of the definitive process design and the subsequent Demonstration Plant Process Design Report and Design Analysis Report. With DOE approval of the remaining process licensor subcontracts, it appears that this work will be completed as per the current schedule. Activity directed toward the Environmental Impact Statement has progressed with the completion of the Draft Environmental Analysis Report and the EIS Scoping Meeting. All other authorized work is continuing, within the constraint of available funds, toward the completion of Phase I. (ERA citation 05:014645)

FE-2036-30 PC **A05**/MF **A01**
Chem Systems, Inc., New York.
Liquid Phase Methanation Pilot Plant Operation and Laboratory Support Work. Quarterly Report, April 1-June 30, 1978.
Aug 78, 81p
Contract EX-76-C-01-2036

LPM Pilot Plant Run 6 using catalyst number 038-A was completed after 646 hours of on-stream time including 24 hours of methanation on HYGAS synthesis gas and 30 hours on steam-methane reformer gas. A wide range of process conditions were tested. Catalyst rate constants, initially higher than in previous runs, increased five-fold during the course of the run and CO conversion approached 100 percent. Initially, the catalyst remained as a packed bed, evidently due to bridging of the catalyst particles. However, the catalyst particles rapidly deteriorated until, by the end of the run, the system was performing as an entrained slurry reactor. The run was terminated when all major pump seals failed due to plugging with catalyst fines. During shutdown after Run 6, reactor internals were designed to alleviate some of the backmixing and distribution problems previously experienced. These internals consisted of vertical stainless steel tubes and a catalyst retention plate. After problems with main oil pump seals had been corrected, oil circulation was begun and catalyst

was loaded into the reactor. Run 7 began with 2200 pounds of INCO-J catalyst (very much the same as INCO-H). Run 7 involved 32 hours of methanation time on reformer gas. The catalyst activity was similar to Runs 3 and 4. The run ended when a major fire occurred at the inboard filter during filter change. In the rates of carbon formation experimental program, ten runs were initiated.The conditions of all runs initiated to date are given. Spent catalysts from completed runs have been analyzed. Preliminary results indicate that carbon has been forming in all cases, even when the feed gas composition is outside the theoretical carbon forming region. Considerably more information will be necessary before these results can be accurately quantified. (ERA citation 05:011062)

FE-2346-53 PC **A03**/MF **A01**
Dow Chemical Co., Midland, MI. Process Development Dept.
Energy from in Situ Processing of Antrim Oil Shale. Quarterly Technical Progress Report, July-September 1979.
L. J. Washington, Jr. 19 Oct 79, 32p DOW/SRPR-53
Contract EX-76-C-01-2346

Several logging, permeability and well communication tests were completed on wells in the 100 and 300 series. These included air permeability, spinner surveys, the use of Sandia's downhole television system and Sandia's tracer gas studies using exp 85 Kr. Both regions were found to have far greater permeability than was present in the first extraction trial on the existing Dow site. Because the interwell communication was somewhat better and because it appeared somewhat easier to keep the system dewatered, the explosively fractured region including Wells number 301, 305 and 306 was chosen to be the site for the next extraction trial. All preparations for this trial were completed. Approval to proceed was received from the Department of Energy and the trial will begin as soon as the personnel required to operate the downhole ignition service can be made available. The target date for beginning operations is now October 12, 1979. (ERA citation 05:014841)

FE-2542-21 PC **A04**/MF **A01**
Conoco, Inc., Stamford, CT.
Phase I: the Pipeline Gas Demonstration Plant. Local Resources Report.
R. A. DiFulgentiz. 60p
Contract EF-77-C-01-2542

Contract No. EF-77-C-01-2542 between Conoco Inc. and the United States Department of Energy (DOE) requires Conoco Inc. to analyze, design, construct, test, evaluate, and operate a Demonstration Plant capable of converting high-sulfur, bituminous caking coal to a high-Btu pipeline quality gas. One of the assignments under the contract is to prepare a report describing the local resources of the plant site area. The Demonstration Plant is to be located in Noble County, Ohio. The investigation of local resources covered Noble County, Guernsey County, and Washington County. The local resources investigated include transportation, utilities, community services and facilities, labor, mineral resources, and construction materials. It is concluded that there is an adequate supply of these resources in the three county area to provide the requisite services for the Demonstration Plant and its workers and their families. (ERA citation 05:014677)

FE-2893-37 PC **A04**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ.
EDS Coal Liquefaction Process Development, Phase IV. EDS Commercial Plant Study Design Update, Offsite Design Basis: Illinois Coal Market Flexibility Sensitivity Case. Interim Report.
W. R. Epperly. Jul 79, 66p
Contract EF-77-A-01-2893

The Illinois Coal Market Flexibility Sensitivity Case will utilize partial oxidation of about one half of the vacuum pipestill bottoms for hydrogen generation and FLEXICOKING of the remaining bottoms to make low Btu gas for use as plant fuel. Partial oxidation replaces steam reforming of methane, ethane and propane used in the Illinois Base Case to generate hydrogen. The methane/ethane product released by elimination of steam reforming will be sold as high Btu gas. HBG will also serve as backup fuel for the onsite area. The offsite design will be developed in considerably less depth and detail than for the Illinois Base Case. Wherever possible, the Base Case design will be used to develop the offsite design for the Sensitivity Case. The offsite design effort will be concentrated on the fuel, steam, water and power systems and solid wastes transport facilities. There will be minimum design efforts (i.e., hold constant, prorate, or use judgement relative to the Base Case) on the remainder of the offsites. (ERA citation 05:014695)

FE-6010-19 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Materials Research for the Clean Utilization of Coal. Quarterly Progress Report, January-March 1979.
1980, 35p
Contract EA-77-A-01-6010-002

Tests to experimentally verify the thermal-elastic stress analysis for the tension-loaded double-cantilever beam specimen were continued and modifications were made to the stress analysis to more accurately predict the change in stress-intensity with temperature. Tests to experimentally verify the stress analysis were conducted using specimens of both A.I.S.I. type 304 and type 310 stainless steel. The first successful experiment in the apparatus for mechanical testing of ceramics at elevated pressure and temperature was completed. In the dry gas (42% H sub 2 , 33% CO, 25% CO sub 2) environment, CC (CaCO sub 3) appears to be stable at 900 exp 0 C and 540 psig. It dissociates at a much lower temperature when steam is present. Preliminary in situ x-ray studies indicate that CC is stable in an atmosphere of CO sub 2 at 1100 exp 0 C and 500 psig. The viscosity of slags was measured at various temperatures, for different compositions and exposed to steam or other gases. An extensive study has been made of vapor transport over a high melting (approx. 1700K) potassium-enriched slag derived from Illinois number 6 coal. About 2% of the K was present in relatively volatile form, mainly K sub 2 SO sub 4 and K sub 2 CO sub 3 . The rate of release of K, and secondary species such as H sub 2 O, O sub 2 , SO sub 2 , CO sub 2 and Na, has been measured over the temperature range 1100-1820K, a N sub 2 -pressure range of 0.2-0.63 atm, and for K sub 2 O slag contents over the range 15.4-8.0 mole %. Eight additional reports of operating experiences and failure analysis were entered into the Center's data base. (ERA citation 05:014669)

LBL-10092 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
LBL Continuous Biomass Liquefaction Process Engineering Unit (PEU).
C. Figueroa, J. Wrathall, and S. Ergun. Nov 79, 7p CONF-791166-2
Contract W-7405-ENG-48
Thermochemical conversion contractors' meeting, Rolla, MO, USA, 7 Nov 1979.

No abstract available.

ORO-3054-T4(PtC) PC **A09**/MF **A01**
Southern Co. Services, Inc., Birmingham, AL.
SRC-I Coal Refinery. Task 3C. Liquid Fuels and Clean Coke Production.
31 Jul 79, 194p
Contract ET-78-C-05-3054

This study summarizes the results of the technical and economic analysis of the process design to produce distillate liquids from Two-Stage Liquefaction of coal (TSL). The TSL Process for making distillate hydrocarbon liquids - by combining a thermal hydrocracking step, such as SRC-I, with a catalytic hydrotreating step - has some unique advantages: process flexibility; selectivity of the desired liquid products; and minimal hydrogen consumption, as compared to one-step coal liquefaction. CE-Lummus has conducted development work to determine the optimum conditions for conversion of SRC-I, as well as for desulfurization and denitrification. The work demonstrated that LC-Fining is capable of converting SRC-I to a heavy syncrude, with conversion as high as 85%+. The proprietary LC-Fining correlations for processing petroleum residua are directly applicable for processing coal-derived extracts. Stable operations have been achieved in both once-through and recycle operations. The distillate products would be lower in sulfur and nitrogen as compared to other coal liquefaction products. The production of liquid fuels by LC-Fining of SRC-I permits the switching of oil-fired boilers from low sulfur petroleum fuels to extremely low-sulfur coal-derived fuels without installing expensive stack gas scrubbing equipment. The demonstrated utility of SRC-I as a base for formcoke binder suggests an integration between the SRC-I and Clean Coke processes whereby SRC-I supplants the hydrogenation of Clean Coke. SRC-I processing would yield - in addition to fuel and binder - light-oil and naphtha fractions which could be processed, together with the corresponding carbonization oils, to produce the light aromatics and tar acids that result from conventional Clean Coke operation. The basic integrated processing scheme is shown in block flow form. (ERA citation 05:014696)

ORO-3054-T5 PC **A09**/MF **A01**
Southern Co. Services, Inc., Birmingham, AL.
SRC-I Coal Refinery. Task 4. Management Plan.
31 Jul 79, 192p
Contract ET-78-C-05-3054

The objective of this project is the first module (demonstration plant) of a commercial scale plant which can be replicated without further scale-up of components to a multi-moldule commercial plant. The initial effort of the multi-phase project consists of the preparation of a preliminary demonstration plant design and cost estimates, economic assessment of a commercial plant, an analysis of the potential market for the products from a commercial plant, and a plan for final design, construction, operation and evaluation of the demonstration plant. The technical objective is the demonstration of the technical feasibility of producing solid SRC at a cost competitive with economic alternatives for such products. The technical problems on the project can be broken down into two basic categories: (1) the substantial scale-up of the equipment used in the pilot plants; and (2) the processes/equipment required in an integrated commercial plant but not included in the pilot plants. The objective of the marketing studies is the assessment of the potential markets for the products from a commercial solid SRC plant (solid boiler fuel, liquid and gaseous hydrocarbon fuels, anode quality coke). The objective of the financial planning is the definition of a method for financing both the demonstration and commercial plants. The method must be practicable with capital charges which make SRC economically competitive. An important objective is the preparation of a cost-sharing proposal which will enable industrial organizations to participate with the DOE in the project. Possible difficulties in meeting scheduled July 31, 1979 phase zero completion dates are mentioned briefly. (ERA citation 05:014697)

PATENT-4 175 929 Not available NTIS
Department of Energy, Washington, DC.
Process for Control of Pollutants Generated During Coal Gasification.
Patent,
R. Frumerman, and H. M. Hooper. Filed 29 Aug 78, patented 27 Nov 79, 6p PAT-APPL-937 903
Supersedes PAT-APPL-937 903-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The present invention is directed to an improvement in the coal gasification process that effectively eliminates substantially all of the environmental pollutants contained in the producer gas. The raw producer gas is passed through a two-stage water scrubbing arrangement with the tars being condensed essentially waterfree in the first stage and lower boiling condensables, including pollutant laden water, being removed in the second stage. The pollutant-laden water is introduced into an evaporator in which about 95% of the water is vaporized and introduced as steam into the gas producer. The condensed tars are combusted and the resulting products of combustion are admixed with the pollutant-containing water residue from the

evaporator and introduced into the gas producer. (ERA citation 05:019950)

PB80-810435 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Gas Scrubbers Used in Pollution Control. 1976-February, 1980 (Citations from the American Petroleum Institute).
Rept. for 1976-Feb 80,
Diane M. Cavagnaro. May 80, 256p
Supersedes NTIS/PS-79/0268. For the companion Published Searches of the NTIS Data Base, see NTIS/PS-78/0189, PB80-806458, and PB80-806466.

The citations from a worldwide literature survey relate to particle and gas scrubbers. The reports discuss design, performance, gas flow characteristics, and chemistry of the pollutants. Pollution control of SO2, NOx, CO, CO2, hydrocarbons, and particles is considered. (This updated bibliography contains 249 abstracts, 47 of which are new entries to the previous edition.)

SAND-79-1826C PC **A02/MF A01**
Sandia Labs., Albuquerque, NM.
Selectivity of Catalysts Towards Coal-Derived Products.
M. G. Thomas, D. G. Sample, and J. L. Floyd. 1980, 6p CONF-800303-5
Contract EY-76-C-04-0789
179. national meeting of the American Chemical Society, Houston, TX, USA, 23 Mar 1980.

Reaction of coal, preasphaltene, asphaltene, and oil has been studied with and without CoMo and FeS sub 2 to identify the areas of coal liquefaction that can be affected by these catalysts. We have shown that, early in the reaction of coal and solvent, an intermediate product (preasphaltene) is produced which is soluble in the slurry. This reaction appears to proceed to completion, so that all subsequent reactions proceed from this intermediate, and not from the coal. This reaction does not appear to be sensitive to H sub 2 in the gas phase, nor does it appear to be very sensitive to the amount of solvent as long as minimum quantity is present. The disappearance of this material is dependent upon H sub 2 , and hydrogenation catalysts should be able to affect these reactions unless the H sub 2 is only retarding cracking. Asphaltene conversion is dramatically affected by catalysts. Conversion of asphaltenes has been increased from 30 to 70 percent in 15 minutes at 400 exp 0 C by the addition of CoMo and FeS sub 2 . Although preasphaltene conversion was not effected by catalysts under these conditions, more oil, with the same gas production, was observed with catalyst -- this would mean a higher quality product. The production of gases, in general, from the classes of products formed in coal liquefaction is greatest for preasphaltene, less for asphaltene, and least for oils. Both CoMo and FeS sub 2 have been found to be active towards asphaltene conversion. Based upon metals loading, unsulfided CoMo is approx. 2.5 times more effective than FeS sub 2 . (ERA citation 05:014698)

7B. Inorganic Chemistry

AD-A083 462/2 Not available NTIS
New Brunswick Univ Fredericton Dept of Chemistry
Convenient Synthesis of Tellurium Chloride Pentafluoride,
Clement Lau, and Jack Passmore. 6 Mar 74, 2p
DRB-REPRINT-4054
Availability: Pub. in Inorganic Chemistry, v13 p2278-2279 1974 (No copies furnished by DTIC/NTIS).

No abstract available.

COO-2584-3 PC **A02/MF A01**
Cornell Univ., Ithaca, NY.
Reduction of Mixed Spinel Oxides. Final Report, April 1, 1976-August 31, 1978.
L. C. De Jonghe. Sep 79, 9p
Contract EY-76-S-02-2584

Dense ferrites of nickel and cobalt, pure and alloyed with various amounts of aluminum in solid solution were reduced in hydrogen between 500 and 1000 exp 0 C. The reaction is topochemical and a product layer proceeds from the surface inward. The rate of the interface advance is determined by a variety of factors including the gas pressure, the temperature, and ferrite composition. In cobalt ferrites, a reaction rate anomaly was observed between 600 and 800 exp 0 C, depending on the cobalt ferrite composition. In this temperature range, the reaction rate was found to decrease with increasing temperature. This is common in the reduction of iron-bearing oxides. The phenomena is explained in terms of the rate of the scale/oxide interface advance in comparison with the rate at which the wustite subscale forms. The study of the reaction kinetics at various temperatures and pressures permitted the evaluation of a number of important kinetic constants. The relative importance of the gas oxide interface reaction and the solid state diffusion processes is discussed. Much of the reduction rates can be understood in terms of a relatively simple model containing only 2 explicit materials parameters. (ERA citation 05:013889)

7C. Organic Chemistry

AD-A083 093/5 PC **A03/MF A01**
Fluorochem Inc Azusa CA
Research in Energetic Compounds.
Interim summary rept. 1 Mar 79-29 Feb 80,
Kurt Baum, Phillip T. Berkowitz, Stephen E. Bottomley, and Wayne A. Vinson. Mar 80, 39p
Contract N00014-78-C-0147

3-Chloro-2-hydroxy-1-propyl acetate, obtained from acetic acid and epichlorohydrin, was converted to its tetrahydropyranyl ether which was cyclized with base. Hydrolysis gave 3-hydroxyoxetane in 37% overall yield. This compound was converted to the tosylate, the bromide and the iodide, none of which underwent displacement by nitrite ion. The reaction of 3-oxetyl tosylate with potassium azide gave 3-azidooxetane which on hydrogenation gave 3-aminooxetne, also obtained from the tosylate and ammonia. Oxidation of the amine with m-chloroperbenzoic acid gave 3-nitrooxetane. Fluoronitromalonate esters were hydrolyzed to fluoronitroacetates, which, with formaldehyde gave the 2-fluoro-3-hydroxy-2-nitropropionates. The hydroxyls were protected as the tetrahydropyranyl ethers. Base hydrolysis of the ester groups followed by acid hydrolysis of the tetrahydropyranyl groups gave 2-fluoro-2-nitroethanol. Subsequently a one step synthesis of this compound from diethyl fluoronitromalonate, potassium carbonate and formaldehyde was developed. 1-Fluoro-1-nitroethylene was prepared by reactions of 2-fluoro-2-nitroethanol with acetic anhydride and potassium acetate, wth phthalic anhydride and also with dicyclohexyl carbodiimide. 2-Fluoro-2,2-dinitroethyl glycidyl ether was polymerized with triflic acid, triflic acid hydrates and triflic anhydride to give polymers with molecular weights up to 1800. NMR evidence indicated that triflate esters were intermediates. (Author)

JAERI-M-7495 PC **A02/MF A01**
Japan Atomic Energy Research Inst., Tokyo.
Radiation-Induced Emulsion Copolymerization of Tetrafluoroethylene with Propylene in Flow System, 1. Conceptional Apparatus Design.
H. Watanabe, J. Okamoto, O. Matsuda, H. Nakajima, and S. Machi. Jan 78, 21p
In Japanese.
U.S. Sales Only.

For industrial radiation-induced emulsion copolymerization of tetrafluoroethylene with propylene, engineering study is necessary to find the optimum process. Flow apparatus was thus designed for the purpose. In the design, material balance, optimum residence time and polymerization rate were estimated from the data. And the methods to control the monomer composition and prevent the deemulsification were also considered. The conditions finally determined are: pressure, 10 exp -3 mm Hg -- 100 Kg/cm exp 2 G; temperature, -196 exp 0 C -- 80 exp 0 C; polymer yield, 0.1 Kg -- 1.0 Kg/run; polymerization, 10 g -- 600 g/l.hr; and structural material, 304 or 316 SUS. The apparatus consists of six units, i.e. continuous monomer feed, emulsifier-water solution feed and latex discharge, gases and solution recycle, reaction, gas analysis, and temperature control. It is so designed as to give operation and labor saving, and also operational safety. (Atomindex citation 09:411431)

JAERI-M-7496 PC **A03/MF A01**
Japan Atomic Energy Research Inst., Tokyo.
Radiation-Induced Emulsion Copolymerization of Tetrafluoroethylene with Propylene in Flow System, 2. Apparatus Safety.
J. Okamoto, H. Watanabe, O. Matsuda, and S. Machi. Jan 78, 37p
In Japanese.
U.S. Sales Only.

In study of the emulsion copolymerization of tetrafluoroethylene with propylene, flow apparatus was designed. Described are safety of the apparatus and emergency countermeasures, and also toxicity of the gas in an accident and chemical and physical properties of the monomer gases. Safety of the operation is confirmed on the basis of data. (Atomindex citation 09:411429)

JAERI-M-7593 PC **A02/MF A01**
Japan Atomic Energy Research Inst., Tokyo.
Radiation-Induced Emulsion Copolymerization of Tetrafluoroethylene with Propylene in Flow System, 5. Dosimetry in the Reactors.
H. Watanabe, and J. Okamoto. Mar 78, 15p
In Japanese.
U.S. Sales Only.

In the radiation-induced copolymerization of tetrafluoroethylene and propylene, the dose rate is one of the most important because entry of radiolytic radicals from water into polymer particles influences polymerization rate and molecular weight. The dose rate and its distribution in various reactor were thus measured by cobalt glass dosimeter. In the pipe reactor, 18 cm from the cobalt-60 source, the dose rate is 1.0 x 10 exp 6 R/h at the middle and 5.5 x 10 exp 5 R/h on both sides. Dose rates decrease with increase of the distance from the cobalt-60 source. This is also the case in the vessel-type reactor. When high dose rate is required, the pipe reactor is advantageous over the vessel-type one. (Atomindex citation 09:411434)

PAT-APPL-6-129 798 PC **A02/MF A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Process for the Preparation of Polycarboranylphosphazenes.
Patent Application,
L. L. Fewell, H. R. Allcock, J. P. Obrien, and A. G. Scopelianos. Filed 12 Mar 80, 9p N80-21464/6, NASA-CASE-ARC-11176-2
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Polydihalophosphazenes are allowed to react at ambient temperatures for at least one hour with a lithium carborane in a suitable inert solvent. The remaining chlorine substituents of the carboranyl polyphosphazene are then replaced with aryloxy or alkoxy groups to enhance moisture resistance. The polymers give a high char yield when exposed to extreme heat and flame and can be used as insulation.

PAT-APPL-6-129 799 PC **A02/MF A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Carboranylcyclotriphosphazenes and Their Polymers.
Patent Application,
L. L. Fewell, H. R. Allcock, J. P. Obrien, and A. G. Sopelianos. Filed 12 Mar 80, 10p N80-21533/8, NASA-CASE-ARC-11176-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Carboranyl-substituted polyphosphazenes are prepared by heat polymerizing a carboranyl halocyclophosphazene at 250 C for about 120 hours in the absence of oxygen and moisture. The cyclophosphazene is obtained by allowing a lithium carborane, e.g., the reaction product of methyl-o-carborane with n-butyllithium in ethyl ether, to react with hexachlorocyclotriphosphazene at ambient temperatures and in anhydrous conditions. For greater stability in the presence of moisture, the chlorine

substituents of the polymer are then replaced by aryloxy or alkoxy groups, such as CF3CH2O(-). The new substantially inorganic polymers are thermally stable materials which produce a high char yield when exposed to extreme temperatures, and can thus serve to insulate less heat and fire resistant substances.

PATENT-4 194 998 Not available NTIS
Department of Agriculture, Washington, DC.
Highly Absorbent Polyhydroxy Polymer Graft Copolymers without Saponification.
Patent,
George F. Fanta, Edward I. Stout, and William M. Doane. Filed 30 Oct 78, patented 25 Mar 80, 6p P880-165533, PAT-APPL-955 828
Supersedes PB-290 090.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Absorbent compositions comprising graft copolymers of starch are prepared by a simplified method of synthesis. By using a mixture of a nonionic acrylic monomer and an anionic sulfonic acid-substituted acrylic monomer, highly absorbent compositions are prepared without the need for an alkaline saponification step. These compositions are also characterized by their ability to absorb large amounts of aqueous fluids under highly acidic conditions.

7D. Physical Chemistry

AD-A083 051/3 Not available NTIS
Materials Research Labs Maribyrnong (Australia)
Short Communication, The Effect of Aliphatic Alcohols on the Hydrolysis of Acetylcholine by Acetylcholinesterase,
R. M. Dawson, and H. D. Crone. 7 Jun 74, 4p
Availability: Pub. in Jnl. of Neurochemistry, v24 p411-414 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 052/1 Not available NTIS
Australian Defence Scientific Service Melbourne
The Initiation of the Photooxidation of Polystyrene by Solar Radiation,
P. J. Burchill, and G. A. George. 26 Feb 74, 6p
Availability: Pub. in Polymer Letters Edition, v12 p497-502 1974 (No copies furnished by DTIC).

No abstract available.

AD-A083 060/4 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Applications de la Sonde Moleculaire aux Composites a Teneur Elevee en Solides. II. Etude du Vieillissement (Applications of the Molecular Probe to Composites of High Solid Content. II. Study of Aging),
G. Perrault, G. Duchesne, and M. Tremblay. 11 Sep 73, 10p DRB-REPRINT-4030
Text in French; summaries in English, Italian and German. See also AD-783 108.
Availability: Pub. in European Polymer Jnl. v10 p747-755 1974 (No copies furnished by DTIC).

No abstract available.

AD-A083 067/9 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Chemical Engineering
Salt Effect in Distillation: A Literature Review. II,
William F. Furter. 4 Oct 76, 12p DRB-REPRINT-4195
See also AD-657 081.
Availability: Pub. in Canadian Jnl. of Chemical Engineering, v55 p229-239 Jun 77 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 068/7 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Chemistry and Chemical Engineering
Surface Area Effects on the Sorption of Hydrogen by Palladium,
Michael J. B. Evans. 6 Sep 73, 7p DRB-REPRINT-4029
Availability: Pub. in Canadian Jnl. of Chemistry, v52 n7 p1200-1205 1974 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 095/0 PC A07/MF A01
Rockwell International Canoga Park CA Rocketdyne Div
Inorganic Halogen Oxidizer Research.
Annual rept. 1 Mar 79-29 Feb 80,
K. O. Christe, C. J. Schack, W. W. Wilson, and R. D. Wilson. 17 Mar 80, 132p Rept no. RI/RD80-134
Contract N00014-79-C-0176

The synthesis and characterization of the following compounds is reported: NF4ClO4, NF4HF2, NF4UF5O, NF4SO3F, FOClO3, FOSO2F, OIF4OF, H3O2SbF6, H3O2AsF6, D3OSbG6, D3OAsF6. The kinetics and mechanism of the formation and decomposition of NF 4 plus salts were determined. The structure of C1F3O was determined by electron diffraction, and vibrational spectra and force fields were obtained for FOClO3 and SF4. (Author)

AD-A083 180/0 Not available NTIS
National Research Council of Canada Ottawa (Ontario) Div of Chemistry
Comment on the Possible Origin of an Anomalous Isotope Effect in Hydrogen Bonds,
Marek Z. Zgierski. 22 Jan 75, 4p Rept no. NRCC-14525
Availability: Pub. in Chemical Physics Letters, v33 n1 p165-167, 15 May 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 181/8 Not available NTIS
National Research Council of Canada Ottawa (Ontario) Div of Chemistry
Site Selection Spectroscopy Luminescence of Solutions with Laser Excitation,
K. Cunningham, J. M. Morris, J. Fuentschilling, and D. F. Williams. 3 Oct 74, 6p Rept no. NRCC-14439
Availability: Pub. in Chemical Physics Letters, v32 n3 p581-585, 1 May 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 200/6 PC A08/MF A01
Air Force Materials Lab Wright-Patterson AFB OH
A Review and Bibliography of Secondary Ion Mass Spectrometry (SIMS).
Technical rept. Jun 78-Jun 79,
W. L. Baun. Jan 80, 161p Rept no. AFML-TR-79-4123

Secondary ion mass spectrometry (SIMS) is reviewed. Fundamental concepts of SIMS including the advantages and disadvantages are shown. Surface disturbances and fundamental collision phenomenon are discussed. Equipment is shown for SIMS, including the mass analyzer and the energy analyzer. Types of mass spectra are discussed including aspects of initial energy and energy distribution. Selection and use of atomic or polyatomic spectra are discussed along with molecular fingerprint spectra. Ion yield, an important aspect of SIMS analysis, is seen to be heavily influenced by oxygen either in the primary beam or on the surface. The advantages and limitations of depth profiling by SIMS are shown. Methods of neutralizing the positive charge accumulation on the surface are discussed. Two methods of imaging secondary ions are detailed and a combination of the SEM with SIMS is also discussed. The increasing popularity of SIMS is seen to be primarily due to the complementary nature of this technique with other surface methods. Applications of the method either as a stand-alone technique or in use with other techniques are seen to be very diverse. (Author)

AD-A083 201/4 PC A02/MF A01
Air Force Materials Lab Wright-Patterson AFB OH
Data Treatment in Electron and Ion Spectroscopy.
Interim rept. Jul 77-Jul 79,
William L. Baun. Dec 79, 20p Rept no. AFML-TR-79-4211

In order to fully utilize newly developed electron and ion surface spectroscopies, the data from these methods must be treated carefully to assure quality and clarity both during and after the experiment. Signal conditioning during the experiment puts the data into proper form for recording and may include steps for amplifying, digitizing, discriminating, modulating, gating, transforming and filtering. In Auger Electron Spectroscopy (AES) where modulation and synchronous detection methods are used, special tailored waveform modulation may be necessary to minimize elemental profile artifacts. Dynamic background subtraction, digital filtering and Fourier transforms improve the signal to noise ratio and facilitate further data processing. If possible, an entire spectrum should be digitally stored at each plotted point on the elemental depth profile. Such spectral storage allows retrieval and examination of the spectrum for peak shape changes or appearance of peaks which were not expected to occur. A point which must be considered is that in bulk spectroscopies we may accumulate signal for whatever period is necessary to obtain desired counting statistics while in surface spectroscopies using an ion beam (such as ISS and SIMS), the eroding surface is ever changing and only a finite time is available for counting at a given depth.

AD-A083 250/1 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
A Theory of Doppler and Binary Collision Broadening by Foreign Gases. II. Isolated Spectral Line Structure,
P. L. Roney. 21 May 74, 12p DRB-REPRINT-4088
See also AD-A076 679.
Availability: Pub. in Jnl. of Quantitative Spectroscopy and Radiative Transfer, v15 p181-190 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 254/3 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Emission from Electronically Excited C2,
S. J. Arnold, G. H. Kimbell, and D. R. Snelling. 25 Feb 75, 8p DRB-REPRINT-4136
Availability: Pub. in Canadian Jnl. of Chemistry, v53 n16 p2419-2425 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 257/6 Not available NTIS
New Brunswick Univ Fredericton Dept of Chemistry
The Reaction of Chlorine Monofluoride with Selenium Dioxide, Tetrachloride and Sulphur Tetrachloride,
C. Lau, and J. Passmore. 9 Jan 75, 5p DRB-REPRINT-4127
Availability: Pub. in Jnl. of Fluorine Chemistry, v6 p77-81 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 269/1 Not available NTIS
Defence Research Establishment Ottawa (Ontario)
Stability of Some Metals in Molten Sodium Metaphosphate,
E. J. Casey, A. R. DuBois, and R. W. Gorman. 1975, 6p Rept no. DREO-723
Availability: Pub. in Corrosion, v31 n10 p358-363 Oct 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 270/9 Not available NTIS
National Research Council of Canada Ottawa (Ontario) Div of Biological Sciences
Luminescence Properties and Related Photochemistry of 4-Amino-2-Methoxypyrimidine,
A. G. Szabo, and K. B. Berens. 11 Jun 74, 5p Rept no. NRCC-14521
Availability: Pub. in Photochemistry and Photobiology, v21 p141-145 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 272/5 Not available NTIS
National Research Council of Canada Ottawa (Ontario) Div of Chemistry
Enthalpies of Mixing of Organic Liquids Measured Directly as a Function of Composition by Means of Scanning Dynamic Flow Microcalorimetry,
J.-P. E. Grolier, G. C. Benson, and P. Picker. 7 May 74, 7p Rept no. NRCC-14285
Availability: Pub. in Jnl. of Chemical Thermodynamics, v7 p89-95 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 273/3 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario) Dept of Chemical Engineering
The Kinetics and Mechanism of the Oxidation of Carbon Monoxide Over an Industrial Vanadium Oxide Catalyst,
R. F. Mann, D. Tycholiz, and A. Stanislaus. 30 Jan 75, 6p DRB-REPRINT-4138
Availability: Pub. in The Canadian Jnl. of Chemical Engineering, v53 p438-442 Aug 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 274/1 Not available NTIS
Toronto Univ (Ontario) Dept of Chemistry
Tri-Isopropylmethyl: An Aliphatic Hydrocarbon Radical of Remarkable Stability,
David Griller, Siddick Icli, Chacko Thankachan, and Thomas T. Tidwell. 24 Jun 74, 3p DRB-REPRINT-4098
Availability: Pub. in Jnl. of the Chemical Society Chemical Communications, p913-914 1974 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 277/4 Not available NTIS
Toronto Univ (Ontario) Dept of Chemistry
The Vibrational Relaxation of H2. I. Experimental Measurements of the Rate of Relaxation by H2, He, Ne, Ar and Kr,
John E. Dove, and Heshel Teitelbaum. 19 Aug 74, 15p
Availability: Pub. in Chemical Physics, v6 n3 p431-444 1974 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 344/2 PC **A03**/MF **A01**
Lockheed Missiles and Space Co Inc Palo Alto CA
Palo Alto Research Lab
Time- and Energy-Dependent Effects in Crystal Spectrometers.
Final rept. 1 Feb-30 Nov 78,
D. A. Kohler, J. G. Pronko, R. K. Bardin, and L. F. Chase. 30 Nov 78, 39p LMSC/D634919, DNA-4774F, AD-E300 735
Contract DNA001-78-C-0124

The behavior of the organic crystal diffraction element KAP under intense pulsed x-ray irradiation has been studied using the Lockheed Palo Alto Research Laboratory (LPARL) high-power Nd-glass pulsed-laser facility. The distortions in spectral data which result from high dose-rate irradiation have been elucidated. The x-ray heating-induced crystal expansion has been observed and shown to imply heating of the crystal to far beyond its normal melting point while maintaining high Bragg reflection efficiency. Streak camera-studies of the phenomena provide further detail and show that the total Bragg reflection efficiency can remain high even for the several ns duration of the x-ray heating pulse.

AD-A083 372/3 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
On the Theory of the Raman Effect,
G. Placzek. 27 Aug 79, 15p Rept no. FTD-ID(RS)T-1039-79
Edited trans. of Zeitschrift fuer Physik (German D.R.) v58 p585-594 1929, by John Hanus.

No abstract available.

AD-A083 403/6 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution MA Dept of Chemistry
Amino Acids in Interstitial Waters of Marine Sediments.
Technical rept.,
Susan M. Henrichs, and John W. Farrington. 18 Dec 79, 9p Rept nos. WHOI-79-96, WHOI-CONTRIB-4256
Contract N00014-74-C-0262
Pub. in Nature, v279 n5711 p319-322, 24 May 79.

No abstract available.

AD-A083 414/3 Not available NTIS
Materials Research Labs Ascot Vale (Australia)
The Mechanism of Formation of Chromate Conversion Films on Zinc,
L. F. G. Williams. 19 Feb 76, 12p
Availability: Pub. in Surface Technology, v4 p355-366 1976 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 448/1 PC **A02**/MF **A01**
Naval Surface Weapons Center Silver Spring MD
The Photolysis of Fluorotrinitromethane.
Preliminary rept.,
Dorothy A. Cichra. 21 Jan 80, 13p Rept no. NSWC/TR-79-99

The photolysis of fluorotrinitromethane was studied as a possible route to fluorodinitromethane. The photolysis in hydroxylic solvents gives fluorodinitromethane in yields (non-isolated) ranging from 25-50% under nonoptimized conditions. Fluorodinitromethane appears not to be formed in the photolysis in non-hydroxylic solvents. (Author)

AD-A083 458/0 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Production of Diatomic Molecule O2 with Vibrational State V = 0, 1 and 2 from the Reaction of O + O2,
Michel J. E. Gauthier, and David R. Snelling. 23 May 74, 10p DRB-REPRINT-4091
Text in French; summary in English.
Availability: Pub. in Canadian Jnl. of Chemistry, v52 n24 p4007-4015 1974 (no copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 467/1 Not available NTIS
National Research Council of Canada Ottawa (Ontario)
X-Ray Crystallography of the Cl3(N(CH3)2)3P3N3 Compounds. III. trans Nongeminal 2,4,6-Trichloro-2,4,6-trisdimethylaminocyclotriphosphazatriene,
F. R. Ahmed, and E. J. Gabe. 1 Nov 74, 5p Rept no. NRCC-14447
Availability: Pub. in Acta Crystallographica, vB31 pt4 p1026-1031 Apr 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 468/9 Not available NTIS
National Research Council of Canada Ottawa (Ontario) Div of Physics
Pulse Radiolysis of Aqueous Solids at 76 K. An Absorption Band in the Infrared,
G. V. Buxton, H. A. Gillis, and N. V. Klassen. 23 Dec 74, 4p Rept no. NRCC-14522
Availability: Pub. in Chemical Physics Letters, v32 n3 p533-536, 1 May 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 472/1 Not available NTIS
Southampton Univ (England) Dept of Chemistry
A Re-Investigation of the A 2 Sigma(+)-X 2 Pi Sub i Band System of NCO,
P. S. H. Bolman, J. M. Brown, A. Carrington, I. Kopp, and D. A. Ramsay. 26 Sep 74, 30p
Availability: Pub. in Proceedings of the Royal Society of London, Series A, v343 p17-44 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 480/4 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Burning of Graphite in an Air Flow at High Temperatures,
N. A. Anfimov. 24 Aug 79, 24p Rept no. FTD-ID(RS)T-1272-79
Edited trans. of Izvestiya Akademii Nauk SSSR, Mekhanika i Mashinostroyeniye (USSR) n5 p3-11 1964, by Martin J. Folan.

No abstract available.

AD-A083 492/9 PC **A04**/MF **A01**
United Technologies Research Center East Hartford CT
Conceptual Design Study for Coherent Anti-Stokes Raman Spectroscopy (CARS) Diagnostics in the AMMRC Ballistic Compressor Facility.
Final rept. Jul-Nov 79,
John A. Shirley, and Robert J. Hall. Mar 80, 58p AMMRC-TR-80-7
Contract DAAG46-79-C-0060

A conceptual design of a diagnostic system using coherent anti-Stokes Raman Spectroscopy (CARS) to determine time resolved temperature and species concentrations in the Army Mechanics and Materials Research Center ballistic compressor has been formulated. Performance calculations have been carried out for hydrogen which is an ideal diagnostic species for this application. Results are also presented of computer code calculations of collision narrowed spectra of nitrogen. Several pump laser systems were compared, and a high repetition frequency Nd:YAG laser was determined to be superior. Population saturation, stimulated Raman gain, and optical breakdown are not expected to pose severe limitations on laser intensity or measurement signal-to-noise ratios. Consideration is given to problems pertinent to operation of the ballistic compressor including compressor recoil, window deflections and generation of CARS from the test section windows. Finally, the possibility of using pulsed stimulated Raman gain spectroscopy (SRGS) as an alternative to CARS at the high densities typical of the ballistic compressor has been identified. SRGS appears to offer adequate measurement ability and possesses certain advantages over CARS. (Author)

AD-A083 540/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Molecular Theory of Solutions and Extraction of Metals and Acids by Associated Reagents,
E. V. Komarov. 20 Apr 79, 15p Rept no. FTD-ID(RS)T-0508-79
Edited trans. of Radiokhimiya (USSR) v12 n1 p312-318 1970, by Charles T. Ostertag, Jr.

No abstract available.

AD-A083 588/4 PC **A02**/MF **A01**
Texas Univ At Austin Dept of Chemistry
Structures and Properties of Fluorinated Pyridines; Assignment of the Two Homo's of Pyridine,
M. J. S. Dewar, S. Doraiswamy, S. H. Suck, Y. Yamaguchi, and S. D. Sharma. 29 Nov 78, 16p AFOSR-TR-80-0312
Grants AFOSR-79-0008, AFOSR-75-2749
Pub. in Chemical Physics v41 nos. 1, 2 p21-33, 1 Aug 79.

No abstract available.

AD-A083 589/2 PC **A02**/MF **A01**
Texas Univ At Austin Dept of Chemistry
MINDO/3 Comparison of the Generalized S.C.F. Coupling Operator and 'Half-Electron' Methods for Calculating the Energies and Geometries of Open Shell Systems,
M. J. S. Dewar, and Santiago Olivella. 11 May 78, 13p AFOSR-TR-80-0313
Grant AFOSR-79-0008
Pub. in Jnl. of The Chemical Society, Faraday Transactions II v75 p829-840 1979.

No abstract available.

AD-A083 590/0 PC **A02**/MF **A01**
Texas Univ At Austin Dept of Chemistry
MO Studies of Polymers. I. Use of MNDO to Calculate Geometries, Vibrational Frequencies and the Electronic Band Structures of Polymers; Formalism and Application to Polyethylene,
M. J. S. Dewar, Y. Yamaguchi, and S. H. Suck. 9 May 79, 13p AFOSR-TR-80-0314

Grant AFOSR-79-0008
Pub. in Chemical Physics v43 p145-156 1979.

No abstract available.

AD-A083 592/6 PC **A02**/MF **A01**
Alabama A and M Univ Normal Dept of Physics and Mathematics
Effects of Pumping Process on the Tipping Angle and Quantum Fluctuations in Superfluorescence.
C. T. Lee. 29 May 79, 4p AFOSR-TR-80-0289
Grant AFOSR-76-2899
Pub. in Physical Review Letters, v43 n15 p1110-1112, 8 Oct 79.

No abstract available.

AD-A083 623/9 PC **A02**/MF **A01**
Arizona Univ Tucson
Operation of Van de Graaff Accelerators for Basic Experiments in Atomic Spectroscopy.
Final rept. 1971-1979,
Stanley Bashkin. 11 Apr 80, 15p Rept no. 1
Contract N00014-75-C-0499

This contract resulted in the publication of approximately 12 research papers and books per year, primarily in the field of beam-foil spectroscopy. Eight students received the degree of Ph.D., and two the degree of M.S. during the reporting period. One Ph.D. student is currently completing his work. A list of publications and personnel is included. (Author)

AD-A083 627/0 PC **A03**/MF **A01**
Mississippi Univ University Dept of Physics and Astronomy
Air Bubble Growth by Rectified Diffusion.
Technical rept.,
Lawrence A. Crum. 15 Apr 80, 42p Rept no. TR-802
Contract N00014-79-C-0404

Measurements are reported of the growth of air bubbles in water by rectified diffusion at 22.1 kHz. Values of the threshold acoustic pressure amplitude were obtained as a function of bubble radius, liquid surface tension and gas concentration. Measurements of the rate of growth of bubbles by rectified diffusion were also obtained as a function of acoustic pressure amplitude for a range of different values of the liquid-vapor surface tension. It was determined that although both the threshold and the growth rate were in agreement with theory for normal values of the surface tension of water, the addition of a surfactant caused the observed thresholds and growth rates to deviate from the predicted values. Surface wave activity that could increase the diffusion rate by acoustic streaming was not detected at low radii and is not thought to be the principal mechanism for the increased diffusion. Some possible explanations are given for the effect. (Author)

AED-Conf-77-283-006 PC **A02**/MF **A01**
Tuebingen Univ. (Germany, F.R.). Lehrstuhl fuer Theoretische Astrophysik.
Theoretical Studies on Rotationally Symmetric Beam Generation Systems with a Field Emission Source.
D. Kern. 1977, 17p CONF-7709140-2
In German.18. conference on electron microscopy, Muenster, F.R. Germany, 4 Sep 1977.
U.S. Sales Only.

To determine the field distribution in beam generation systems with fine field emission sources, a combined analytic and discrete solution of the Laplace equation is described. The method is applied to a diode and triode system. Emittance diagrams are established in order to determine the narrowest electron beam cross section. (Atomindex citation 09:376245)

AED-Conf-77-389-003 PC **A02**/MF **A01**
Tuebingen Univ. (Germany, F.R.).
Polymorphy of Perovskites A sub 2 (Bsub(1/2)SEsub(1/2))MO sub 6.
S. Kemmler-Sack. 1977, 7p
In German.
U.S. Sales Only.

From the class of oxygen perovskites type A(II) sub 2 B(III)sub(1/2)B(I)sub(1/2)M(VI)O sub 6 , some compounds with A = Ba (in some cases also A = Sr) and M = Mo, Te, W, and U are presented. The structures of these compounds are discussed, and the related principles are explained. (Atomindex citation 09:375480)

AED-Conf-77-389-004 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Unusual Compounds in Rare Earth Metal-Halogen Systems and Their Special Properties.
H. Baernighausen. 1977, 1p CONF-7709146-4
In German.17. meeting of the gesellschaft deutscher chemiker, Muenchen, F.R. Germany, 12 Sep 1977.
U.S. Sales Only.

No abstract available.

AED-Conf-77-389-007 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Synthesis, Structure, and Properties of Rare Earth Metal Sulfides.
W. Wichelhaus. 1977, 1p CONF-7709146-5
In German.17. meeting of the gesellschaft deutscher chemiker, Muenchen, F.R. Germany, 12 Sep 1977.
U.S. Sales Only.

No abstract available.

AED-Conf-77-537-007 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Comparison of the Trace Analysis of Heavy Metal Aerosols by Means of Atom Absorption Spectroscopy and Proton-Induced X-Ray Spectrometry.
K. H. Nottrodt, H. W. Georgii, K. O. Groeneveld, and 1977, 7p CONF-7710173-3
In German.Meeting on aerosols in natural science, medicine and technology-measurement techniques and technical application, Karlsruhe, F.R. Germany, 26 Oct 1977.
U.S. Sales Only.

The comparative analyses of AAS and PIXE (Proton-Induced X-ray Emission) show very good agreement in the absolute values of the concentrations of all metals analyzed. The practical detection limits are about 10 exp -10 g for the investigated element in both measuring processes, so that the analysis of pure air samples is possible with both methods. PIXE is particularly suitable for the analysis of aerosol samples as it is not necessary to process the filter, the samples are not destroyed, and many elements can be simultaneously analyzed within a short time (5-10 min.). Furthermore, the possibility of automatization enables an efficient treatment of meteorological problems. (Atomindex citation 09:390898)

AED-Conf-78-058-000 PC **A03**/MF **A01**
Freiburg Univ. (Germany, F.R.). Inst. fuer Makromolekulare Chemie.
Macromolecular Colloquium Freiburg.
1977, 33p CONF-780268-
Macromolecular colloquium, Freiburg, F.R. Germany, 23 Feb 1978.
U.S. Sales Only.

Separate abstracts were prepared for the individual papers presented at the conference. (Atomindex citation 09:419199)

AEEW-R-826 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
MINNIE - WRS System Module Number 17133 for Converting Material Composition Data to a Standard Form.
M. J. Grimstone. Jun 78, 14p
U.S. Sales Only.

The WRS Modular Programming System has been developed as a means by which programmes may be more efficiently constructed, maintained and modified. In this system a module is a self-contained unit typically composed of one or more Fortran routines, and a programme is constructed from a number of such modules together with a linking module. This manual describes one WRS module, the function of which is to read material compositions presented in any of a variety of forms, and to reduce them all to a standard format. The information given in the manual is of use both to a programmer wishing to incorporate the module in a programme, and to a user of such a programme. (Atomindex citation 10:422914)

CEA-CONF-4077 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Irradiation Effects During Ion Analysis. Consequences on the Depth Resolution.
Y. Limoge, R. Seguin, and J. L. Seran. 10 Aug 77, 18p CONF-770849-5
In French.Microprobe analytical society meeting, Boston, MA, USA, 16 Aug 1977.
U.S. Sales Only.

Irradiation effects are very important in ionic analysis, particularly the direct displacement of atoms in collision cascades and the diffusion of point defects. A model of atomic diffusion acceleration is developed and its forecastings on the depth resolution are discussed. Depth concentration profiles are observed on films deposited on a substrate. The observation of thin films irradiated in analysis conditions also enables to investigate the nature of damages induced by the primary irradiation. (Atomindex citation 09:413688)

CEA-N-2014 PC **A05**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Recherche et Analyse.
Pulse Radiolysis Study in Ethanol and N-Propanol of the Solvated Electron Formation and Reactivity at Low Temperatures.
M. R. Bono Merino. Jan 78, 84p
In French.Thesis.
U.S. Sales Only.

The electron solvation process in polar media has been studied in liquid ethanol and n-propanol at temperatures near their melting points. The results show that using the change of absorption at a given wavelength to determine the solvation time leads to a value which varies with the wavelength considered. Furthermore, for n-propanol it appears that the process occurs without a definite order. Studies of the spectral shifts show that the passage from the initial to the final spectrum (solvated electron spectrum) involves intermediate transient spectra which probably correspond to partly solvated states of the electron. The interpretation of these various results points out the ambiguity of the kinetic measurements: the simultaneous existence of several partly solvated states of the electron is not consistent with the hypothesis previously admitted that the molar extinction coefficient at a given wavelength is unique and does not vary with time. The reaction of the solvated electron with acetone has been studied in ethanol in the temperature range from +25 to -105 exp 0 C: this reaction is diffusion controlled. (Atomindex citation 09:410588)

CEA-R-4814 PC **A04**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Genie Radioactif.
Contribution to the Study of the Fluorination of Ruthenium and Its Dioxide.
C. Courtois. Dec 77, 63p
In French.
U.S. Sales Only.

Compounds formed during fluorination of ruthenium and its dioxide are studied. By chemical analysis the constitution of these compounds is cleared up. RuF sub 5 is the main compound formed, but a secondary product is obtained which is RuF sub 8 . The vapor pressure of this product is given between 178 and 221 exp 0 K, and its infrared spectrum is drawn. (Atomindex citation 09:410658)

CEA-R-4849 PC **A14**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Chimie-Physique.
Study of a Few Compounds with Unpaired F Electrons.
E. Soulie. Jul 77, 309p
In French.Thesis.
U.S. Sales Only.

Ligand field theory is applied to compounds of uranium (V) (configuration f exp 1), uranium (IV) (f exp

2), and to hexagonal neodymium sesquioxide A-Nd sub 2 O sub 3 (f exp 3). The reinterpretation of the electronic absorption and paramagnetic resonance spectra of UF sub 6 Cs allows a determination of the spin-orbit coupling constant, the Newman intrinsic crystal field parameters, and the orbital angular momentum reduction factors, pointing to a degree of sigma covalence for the 5f orbitals. Raman diffusion and carbon 13 SMR spectra of U(NCS) sub 8 (N(C sub 2 H sub 5) sub 4) sub 4 dissolved in CD sub 3 NO sub 2 show that cubical coordination for uranium, known for the solid, is maintained in solution. Thermal variation of the magnetic susceptibility of this complex, quantitatively interpreted, leads to the description of the energy levels of f exp 2 configuration. For U(CH sub 3 -CO-CH-CO-CH sub 3) sub 4 the interpretation of the susceptibility curve results into the prediction of the susceptibility anisotropy, and the calculation of the unpaired spin density on the methin proton. Last, it was shown by proton magnetic resonance that U(CF sub 3 -CO-CH-CO-C sub 6 H sub 5) sub 4 behaves as a chemical shift reagent. (Atomindex citation 09:410573)

CEA-R-4901 PC **A07**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Genie Radioactif.
Contribution to the Coordination Chemistry of Penta, Hexa and Heptavalent Ions of 5F Elements.
C. Musikas. Jan 78, 139p
In French.Thesis.
U.S. Sales Only.

This report has two main parts in which are discussed results dealing with: - aquo and hydroxo complexes of penta, hexa and heptavalent ions of 5f elements - pseuso halides complexes of these ions (SCN exp - , N sub 3- , CN exp -). It has been shown, by spectrophotometric and electrochemical measurements, that U (V) possesses an aquo ion more acid than the known UO sub 2+ ion. This form is observed as insoluble hydroxid near pH 3.0 or as soluble polynuclear hydroxo complexes at lower pH. Hydroxo anionic complexes of U (VI) have been observed and one can precise the mecanism of hydrolysis of UO sub 2++ ions beyond the hydroxide UO sub 2 (OH) sub 2 . At pH 9 to 12, polynuclear species with low negative charge have been observed. At pH 13, others OH exp - ions enter in the coordination sphere of UO sub 2++ and mononuclear species are obtained. Reduction of polynuclear species leads to mixed hydroxo complexes of 'blue type'. Studies of hydrolysis of NpO sub 2+ allow to propose an hydrolysis mechanism similar to UO sub 2++ one. With electrochemical methods that in acidic media Np (VII) is present as NpO sub 3+ ions. Solubility product of NpO sub 3 OH has been measured. The second part is devoted to pseudohalides complexes of UO sub 2++ , UO sub 2+ and NpO sub 2+ ions. (Atomindex citation 09:410594)

CEA-R-4933 PC **A16**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Genie Radioactif.
Crystal Chemistry of Transuranium Pnictides.
J. P. Charvillat. Nov 78, 364p
In French.Thesis.
U.S. Sales Only.

The synthesis and crystal chemistry of M transuranium element pnictides (M = Np, Pu, Am and Cm) are described. Msub(a) Xsub(b) binary compounds have been prepared (X = P, As, Sb, and Bi) with the following (a:b) stoechiometric ratios: (1:2), (3:4), (1:1), (4:3). MXY and M sub 2 XY sub 2 ternary compounds (Y = O, S, Se and Te) have also been prepared. The crystal structure encountered in these compounds of Pu, Am and Cm is generally the same as in the corresponding rare-earth compounds. Thorium and uranium compounds were grouped in a distinct set where the actinide ion was considered as tetravalent. Neptunium exhibits an intermediate behaviour and was found to give either uranium-like compounds such as NpAs sub 2 , or rare-earth like compounds such as NpSn sub 2 . From the plots of the lattice constants versus the actinide atomic number, we could infer that the 5f electrons are likely to be delocalised in the compounds; no 5f - shell contraction seems to occur. Furthermore these results lead to assume that in the isostructural diantimonides of the light rare-earths, 4f wave-fonctions must be involved in the bonds just; like in the LnSbTe ternary compounds. As the f electrons delocalization is dependent on crystal structure, the various structures found in our system have been studied. (Atomindex citation 10:476118)

CENBG-7608 PC **A06**/MF **A01**
Bordeaux-1 Univ., 33 - Gradignan (France). Centre d'Etudes Nucleaires.
Anisotropy Evidence for the K-Shell Ionization Probability in the Use of Ag(P,p)Ag Reaction. These (3e Cycle),
S. Andriamonje. 1976, 115p
In French.
U.S. Sales Only.

The ionization probability of silver by 1-Mev protons has been measured at large angles up to 110 exp 0 C. The experimental results have been obtained using the coincidence between scattered protons and KX rays. The angular dependence in the ionization probability at small impact parameters indicates an anisotropy as expected by Ciochetti and Molinari in their theoretical study of K-shell ionization probability associated with nuclear reactions. The results have been compared to the predictions of the BEA (Binary Exchange Approximation) method, including relativistic corrections of deflection and binding energy. The anisotropy coefficient deduced from the comparison of experimental and theoretical results is in good agreement with expected values. (Atomindex citation 09:410173)

CLM-R-181 PC **A03**/MF **A01**
UKAEA Culham Lab., Abingdon (England).
Monte Carlo Computer Program for Analysis of Backscattering and Sputtering in Practical Vacuum Systems.
K. P. Brown. Jan 78, 32p
U.S. Sales Only.

A Monte Carlo computer program originally developed for analysis of molecular gas flow in axi-symmetric vacuum systems has been extended to include modelling of high energy backscattering and sputtering processes. This report describes the input data required by the computer program together with the results produced. A general description is given of the program operation and the backscattering and sputtering modelling used. An example calculation is included to illustrate practical application of the program. (Atomindex citation 10:488957)

CNEA-420 PC **A02**/MF **A01**
Comision Nacional de Energia Atomica, Buenos Aires (Argentina).
Complexo-Potentiometric Determination of Mercury (II) in Chlormerodrin and Mercuric Chloride Labelled with Radioactive Mercury.
E. E. Duek. Sep 76, 8p
In Spanish.
U.S. Sales Only.

A method is described for determining the amount of mercury (II) in radioactively labelled chlormerodrin and mercuric chloride. By measuring the absolute activity in an ionization chamber, the specific activity is therefore immediately obtained. The determination of Hg (II) is based on a complexometric titration. Because of method characteristics and speed convenience, the end point is observed by means of a pH-meter. A comparison is made with a determination performed by detecting the end point with color-change indicators. The error is estimated, and the results are statistically interpreted. (Atomindex citation 10:422848)

CONF-791134-9 PC **A02**/MF **A01**
Argonne National Lab., IL.
Characterization of Association in Pyridine Vapor by Measurement of Thermal Conductivity.
L. A. Curtiss, D. J. Frurip, C. Horowitz, and M. Blander. 1979, 25p
Contract W-31-109-ENG-38
16. international thermal conductivity conference, Chicago, IL, USA, 7 Nov 1979.

The thermal conductivity of pyridine vapor has been measured as a function of pressure in the range 100 to 500 torr at four temperatures (366.2, 371.1, 376.7, and 386.6 K) in a thick hot wire cell using a relative technique. The thermal conductivity increases linearly with pressure (4.3% over one atmosphere pressure at 376.7 K). Analysis of the data in terms of dimer formation in the vapor using the Butler-Brokaw expression leads to an enthalpy and entropy of association of -4.93 kcal mol exp -1 and -22.2 cal deg exp -1 mol exp -1 , respectively. Ab initio molecular orbital calculations using a minimal basis set on five possible structures for the pyridine dimer tentatively indicate that the most stable structure has a linear N....H-C hydrogen bond with the planes of the two pyridine molecules perpendicular to each other. (ERA citation 05:016262)

COO-2026-39 PC **A02**/MF **A01**
Minnesota Univ., Minneapolis. Dept. of Chemical Engineering and Materials Science.
Studies in Chemical Reactivity. Progress Report, January 1-December 31, 1979.
R. W. Carr, Jr. Dec 79, 15p
Contract EY-76-S-02-2026

Data on the collisional deactivation of chemically activated polyatomic molecules show a trend of decreasing < delta E>, the average energy removal per gas kinetic collision, with increasing size of activated molecule when polyatomic collider species of similar molecular structure and nearly constant number of atoms are used. Calculations of < delta E> by a quasistatistical transition modes model give quantitative agreement with the experimental data. Measurements of photoionization cross sections and yields of some organic molecules have been made in a double ionization chamber. Work is proceeding on an experiment to detect chemically ativated molecules by photoionization. Observations have been made of the production of CF sub 2 in the flash photolysis of 1, 3-dichlorotetrafluoroacetone, and the rate of removal of CF sub 2 by reaction. Observations have also been made on the production and removal of ClO when O sub 2 is present in the reaction. Analysis of reaction products from the steady illumination photolysis of 1, 3-dichlorotetrafluoroacetone and oxygen mixtures at 313 nm/have been done by gas chromatography, infrared spectrometry and mass spectrometry. Continued efforts to observe CH sub 2 ('B sub 1) implies CH sub 2 (A' sub 1) luminescence from photolysis of ketene, diazomethane and diazirine were unsuccessful. Investigation of the reactions of methylene by flash photolysis with time resolved mass spectrometry have been undertaken. (ERA citation 05:013990)

COO-2086-90 PC **A02**/MF **A01**
Wayne State Univ., Detroit, MI. Dept. of Chemistry.
Radiolysis Studies on Reactive Intermediates. Technical Progress Report, November 1, 1978-November 1, 1979.
L. Kevan. Nov 79, 22p
Contract EY-76-S-02-2086

Analysis methods for electron spin echo modulation patterns were improved and were used to determine the silver atom solvation structure in water and methanol and the geometry of solvated electrons in organic matrices. New evidence for presolvated electrons in polar matrices was obtained, and the mechanism of electron solvation in pure and in mixed matrices was clarified. (ERA citation 05:013994)

COO-2807-15 PC **A02**/MF **A01**
Kansas State Univ., Manhattan. Dept. of Chemistry.
Experimental Investigation of the Chemistry of Exccited States of Rare Gases. Fourth Quarterly (And Annual) Progress Report, July 15, 1978-October 15, 1978.
D. W. Setser. Dec 78, 12p
Contract EY-76-S-02-2807

A brief account is given of work on the quenching of XeF(B) and other excited rare-gas systems. A more detailed report is given of the studies of the vacuum uv photolysis of XeO sub 4 and reactions of Xe(exp 3 P sub 2) and Ar(exp 3 P sub 2) with XeO sub 4 . (ERA citation 05:013991)

COO-2807-17 PC **A02**/MF **A01**
Kansas State Univ., Manhattan. Dept. of Chemistry.

Experimental Investigation of the Chemistry of Excited States of Rare Gases. Second Quarterly Progress Report, January 15, 1978-April 15, 1979.
D. W. Setser. May 79, 8p
Contract EY-76-S-02-2807

The reactions of Kr(exp 3 P sub 1) and Xe(exp 3 P sub 1) with halogen compounds, producing rare gas halides, was studied. Abstracts of two papers on excited rare gas states are included. (ERA citation 05:013992)

DESY-SR-78/04 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Photoemission Studies on Phtalocyanine Compounds: Cross Section Dependence of Outer Core Levels.
M. Iwan, W. Eberhardt, G. Kalkoffen, E. E. Koch, and C. Kunz. Apr 78, 9p
U.S. Sales Only.

The cross sections of outer levels and the valence bands of Pb- und Pt-Phtalocyanine have been studied using monochromatized synchrotron radiation in the photon energy range h nu = 20 - 260 eV. The h nu -dependence of the Pb-5d and Pt-4f partial cross sections are discussed in a one electron model. Various mechanisms for the observed broadening of the outer metal core levels in the Phtalocyanines compared to the pure metals are considered. (Atomindex citation 09:405652)

DFVLR-IB-453-76/1 PC **A07**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Stuttgart (Germany, F.R.).
Emission Spectroscopic Study of the System F sub 2 -H sub 2 in the Shock Tube. Internal Report.
G. Rimpel. 1976, 140p
In German.
U.S. Sales Only.

In a shock tube Ar-F sub 2 -H sub 2 mixtures, containing 0.2% F sub 2 and 0.2% H sub 2 , were heated up to temperatures of approx. 830 or 940 K. The pressures amounted to 4.0 or 3.6 bar respectively. The following reaction was observed via the radiation emission of the vibrationally excited HF molecules. The spectral range from 660 to 960 nm was investigated. From these measurements it was possible to determine the population numbers of discrete vibrational levels (v = 3,...,9) of the HF molecule. Chemical kinetic calculations were carried out in order to evaluate from these measurements information on rate coefficients of certain elementary reactions. By adapting the calculations to the measurements it was found, among other things, that VVT processes between HF and HF do occur much faster at higher vibrational quantum numbers than originally supposed. Furthermore, statements could be made on VT processes between HF and Ar as well as on the pumping reaction H + F sub 2 implies HF + F. (Atomindex citation 09:363915)

DOE/ER/10383-1 PC **A03**/MF **A01**
Brigham Young Univ., Provo, UT.
Third Symposium on Macrocyclic Compounds.
1979, 48p CONF-7908105-(Absts)
Contract AC02-79ER10383
Annual symposium on macrocyclic compounds, Provo, UT, USA, 6 Aug 1979.

At the Third Symposium on Macrocyclic Compounds there were sessions on facilitated transport, analytical applications, organic synthesis and reactions, phase transfer catalysis, and metal complexation. Abstracts of the individual presentations are included. (ERA citation 05:016265)

DOE/ER/10425-01 PC **A02**/MF **A01**
Minnesota Univ., Minneapolis. Dept. of Chemistry.
Variational Transition State Theory. Progress Report, July 1, 1979-June 30, 1980.
D. G. Truhlar. Feb 80, 10p
Contract AC02-79ER10425

The variational transition state theory (VTST) of chemical reaction rates has been further developed and two previously developed and one new version have been illustrated and tested by various applications to collinear and three-dimensional reactions of the type A + BC implies AB + C. The first two versions considered are canonical variational theory (CVT), which is based on curves of free energy of activation as functions of location of the VTST dividing surface, and microcanonical variational theory (mu VT), which is based on minimizing the reactive flux through the VTST dividing surface at each total energy. CVT is simpler but mu VT is more accurate. The new theory, improved canonical variational theory (ICVT), is almost as simple as CVT but almost as accurate as mu VT. This has been demonstrated by applications to H, O, F, Cl, and I reacting with H sub 2 , H reacting with F sub 2 and Cl sub 2 , and various isotopic analogs and model systems. It was also demonstrated that VTST leads to very good agreement with accurate quantal results for several collinear reactions. Another project used VTST to explore the systematics of kinetic isotope effects for three-dimensional reactions. The predictions sometimes differ considerably from those of the conventional theory. (ERA citation 05:013986)

EUR-5934 PC **A02**/MF **A01**
Commission of the European Communities, Geel (Belgium). Central Bureau for Nuclear Measurements.
Certification of Oxygen in Non-Ferrous Metals: Pt.6. Oxygen in Molybdenum.
J. Pauwels. 1978, 22p
U.S. Sales Only.

The report describes the technical details of the preparation and analysis of a reference material for 'oxygen in molybdenum'. Instructions for use of the RM, especially in relation with surface preparation of samples before analysis, are given. The material proposed by BCR (CRM-No 23) has an oxygen content of 14.7 mu g/g, and an uncertainty of 2.1 mu g/g. (Atomindex citation 10:422681)

EUR-5935 PC **A02**/MF **A01**
Commission of the European Communities, Geel (Belgium). Central Bureau for Nuclear Measurements.
Certification of Oxygen in Non-Ferrous Metals: Pt.7. Oxygen in Titanium.
J. Pauwels. 1978, 20p
U.S. Sales Only.

The report describes the technical details of the preparation and analysis of a reference material for 'oxygen in titanium'. Instructions for use of the RM, especially in relation with surface preparation of samples before analysis, are given. The material proposed by BCR (CRM-No.24) has an oxygen content of 608 mu g/g, and an uncertainty of 23 mu g/g. (Atomindex citation 10:422682)

FEI-775 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Reaction of Europium Oxide with Liquid Alkali Metals. 1. Chemical Reaction of Europium Oxide with Sodium.
A. G. Bespalov, A. E. Rusanov, L. M. Belova, and N. G. Shabalina. 1977, 12p
In Russian.
U.S. Sales Only.

The results are presented of experiments on the study of the chemical interaction of europium oxide with sodium in application to service conditions of control system rods and protection rods of nuclear reactions with a sodium coolant. Data are presented on the X-ray structural analysis of products of the reaction between europium oxide and sodium after isothermic tests on the range of temperatures between 700 and 1000 deg C of powders of cubic and monoclinic europium oxide in bulbs of Kh16N15M3 austenite steel filled with sodium. Considered is the role of oxygen in the interaction of oxides with sodium and several other factors determining the character and the degree of inbasedteraction of europium oxide-absorption materials and of sodium coolant. (Atomindex citation 09:413773)

FIAS-R-41 PC **A03**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Electron-Photon Angular Correlations in the Electron Impact Excitation of H(2P).
S. T. Hood, E. Weigold, and A. J. Dixon. Jul 78, 40p
U.S. Sales Only.

Inelastically scattered electrons have been detected in coincidence with Lyman alpha photons in the electron impact excitation of the 2p level of atomic hydrogen. Angular correlations have been measured for incident energies of 40eV, 54.4eV and 100eV at electron scattering angles of 10 exp 0 , 15 exp 0 and 20 exp 0 and at 200eV, 10 exp 0 . Values of the parameters describing the angular correlations have been obtained. The data have also been compared to calculations in the Born, distorted wave polarized orbital, unrestricted Glauber, distorted wave Born, classical path T-matrix, Coulomb projected Born and hybrid close coupling approximations. None of these appears entirely satisfactory over the range of energies and angles examined. (Atomindex citation 10:488830)

FIAS-R-42 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Theory of (E,2E) Experiments.
I. E. McCarthy. Sep 78, 19p
U.S. Sales Only.

The (e,2e) experiment, which involves complete knowledge of the momenta and energies of four bodies, an incident electron, a target atom or molecule in its ground state, two outgoing electrons and the residual ion in an eigenstate f (which may be in the continuum), is discussed. (Atomindex citation 10:488872)

FIAS-R-45 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies.
Momentum Distributions for the Valence Orbitals of Hydrogen Fluoride.
C. E. Brion, I. E. McCarthy, I. H. Suzuki, and E. Weigold. Jun 79, 11p
U.S. Sales Only.

The binding energy spectra and momentum distributions for the three valence orbitals of hydrogen fluoride have been obtained using the binary (e,2e) method at a total energy of 400 eV. The experimental shapes of the momentum distributions are compared with results of calculations using the wave functions of Snyder and Basch. Agreement is quite good for the 2sigma inner valence orbital. However, significant differences between theory and experiment are found for the 1 pi and 3sigma orbitals. In particular the 1 pi orbital is more spatially extended than the calculated wave function suggests. (Atomindex citation 10:488773)

IEA-DT-039 PC **A03**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Efficiency of Some Spectrochemical Carriers. Their Use in Quantitative Analysis of Eighteen Trace Amounts Elements in Uranium and its Compounds.
R. P. Gomes. Jan 78, 43p
In Portuguese.Thesis.
U.S. Sales Only.

A comparative study of the efficiency of some spectrochemical carriers for the quantitative spectrographic analysis of Ag, Al, B, Bi, Cd, Cr, Cu, Fe, Mg, Mn, Mo, Ni, P, Pb, Si, Sn, V and Zn in uranium-base materials is presented. The volatility behavior of the eighteen elements is verified by means of the moving plate technique and each of the mentioned carriers. The best results are obtained with 4% In sub 2 O sub 3 , 6% AgCl and 5% NaF in a U sub 3 O sub 8 matrix. The sensitivities for some elements were extended to fractions of p.p.m. The precision, accuracy and acceptability of the method are calculated for all elements. The total error values as approximately in the range of 16-45%. (Atomindex citation 09:413672)

IEA-DT-043 PC **A04**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Determination of Oxygen Content in Steel Using Activation Analysis with 14 MeV Neutron.
Thesis,
C. E. Calado. Feb 78, 68p
In Portuguese.
U.S. Sales Only.

In the quantitative analysis of oxygen in steel by fast neutron activation analysis the oxygen content

is evaluated from the measured activity of exp 16 N produced. Steel samples are irradiated in 14 MeV neutron flux. After irradiation the samples are pneumatically transfered to the counting terminal where activity is measured. Oxygen concentrations, are obtained by comparison with standards of specified oxygen content. (Atomindex citation 09:413657)

IEA-DT-113 PC **A03**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Studies for the Yttrium Determination by Activation Analysis, in the Presence of Lanthanides. Application of the Substoichiometric Technique.
D. I. T. da Silva. Dec 78, 35p
In Portuguese.Thesis.
U.S. Sales Only.

Some methods using extraction chromatography for the separation of yttrium from the lanthanide elements were applied. The separation of yttrium was studied, using di-(2 ethylhexyl) orthophosphoric acid as stationary phase, Kieselguhr as support and HNO sub 3 of concentration between 4,5 and 5,0 N as the mobile phase. In these conditions, about 50% of pure yttrium was obtained. The substoichiometric technique was applied to the determination of yttrium. The elements was partially complexed and the Y exp 3 + ions were separated from the complex (EDTA-Y) exp - by means of a cationic resin. The sensitivity, precision and accuracy which can be expected in the analytical results were studied. The possibility of the analysis of a sample containing 1 part per million of yttrium with an error just above 8% was demonstrated. It was also shown that, admitting an error of 10%, it is possible to determine 60 parts per billion of yttrium. (Atomindex citation 10:475907)

IEA-496 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Div. de Engenharia Quimica.
Determination of UO sub 2 Small Quantity in UF sub 4 by X-Ray Diffraction.
M. I. Costa, I. M. Sato, and K. Imakuma. Dec 77, 23p
In Portuguese.
U.S. Sales Only.

In the fluorination process, the final product UF sub 4 contains different levels of UO sub 2 as a contaminant. A routine method for quantitative analysis by x-ray diffraction has been developed. Standard curves have been plotted using mixtures of UO sub 2 /UF sub 4 with measures of intensity of (III) peak of UO sub 2 by the step scanning process. The integrated intensity versus UO sub 2 concentration curves present a linear behavior in the range from 0 to 4%. A good reproducibility of measuring process has been observed through statistical analysis which permits determination of low fractions of UO sub 2 in UF sub 4 with +- 0.08% of accuracy. (Atomindex citation 09:413661)

IEA-497 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Div. de Engenharia Quimica.
Quantitative Spectrographic Analysis of Li, Na and Ca in Uranium Base Materials, Using the Carrier Distillation Technique.
R. P. Gomes, and J. de Brito. Jan 78, 10p
In Portuguese.
U.S. Sales Only.

A spectrographic method for the quantitative determination of Ca, Li and Na in uranium base materials is described. The carrier distillation technique is used and a study is made for the selection of best carrier compounds. In U sub 3 O sub 8 matrix, the best results are obtained with 4% In sub 2 O sub 3 for the determination of Na and a 15% mixed carrier (3 NaCl exp + 1 Y sub 2 O sub 3) for the determination of Ca and Li. The minimum determination limit for Ca and Li is 1 ppm while for Na it is 15 ppm. The precision of the method is calculated and the relative standard deviation is found to be 11, 16 and 6.5% for Ca, Li and Na respectively. (Atomindex citation 09:413673)

IEA-500 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Div. de Engenharia Quimica.
Quantitative Spectrographic Analysis of Impurities in Antimonium.
J. de Brito, and R. P. Gomes. Jan 78, 11p
In Portuguese.
U.S. Sales Only.

An emission spectrographic method is describe for the determination of Ag, Al, As, Be, Bi, Cd, Cr, Cu, Ga, Ni, Pb, Sn, Si, and Zn in high purity antimony metal. The metal sample ia dissolved in nitric acid(1:1) and converted to oxide by calcination at 900 exp 0 C for one hour. The oxide so obtained is mixed with graphite, which is used as a spectroscopic buffer, and excited by a direct current arc. Many parameters are studied; optimum conditions are selected for the determination of the impurities mentioned. The spectrum is photographed in the second order of a 15.000 lines per inch grating and the most sensitive lines for the elements are selected. The impurities are determined in the concentration range of 1 - 0.01% with a precision of approximately 10%. (Atomindex citation 09:413650)

INIS-mf-4119 PC **A04**/MF **A01**
Universidade Federal do Rio de Janeiro (Brazil). Coordenacao dos Programmas de Posgraduacao de Engerharia.
Chemical Effects of (N,2N) Reactions on Iodate and Periodates Systems.
J. M. A. de Mendonca. Dec 75, 75p
In Portuguese.
U.S. Sales Only.

The chemical consequences of (n,2n) reactions on crystalline sodium iodate and periodates were investigated measuring the initial yield and the post irradiation thermal annealing yields (90 exp 0 C) of the separated fractions I exp - , IO sub 3- and IO sub 4- , NaIO sub 3 , NaIO sub 3 .H sub 2 O and NaIO sub 4 , Na sub 4 H sub 2 IO sub 6 , Na sub 4 I sub 2 O sub 9 .3H sub 2 O containing exp 127 I and exp 129 I, or both, were irradiated with 14 MeV neutrons. Results obtained show different effects for each system and that exp 126 I and exp 128 I isotopes keep the same behavior in the irradiated compounds containing only alpha exp 127 I or exp 129 I and in compounds having both exp 127 I and exp 129 I. Neither isotope effect nor qualitative differences on thermal annealing at 90 exp 0 C were observed. The annealed ractions in the three studied periodates were IO sub 3- and IO sub 4- . These results differ from the ones reported previously for (n, gamma) reactions on the same compounds. (Atomindex citation 09:365028)

INIS-mf-4272 PC **A03**/MF **A01**
Pontificia Univ. Catolica do Rio de Janeiro (Brazil). Inst. de Fisica.
Elimination of Matrix Effect in Quantitative Analysis of Elements Using X-Ray Fluorescence. Application in Ambient Pollution.
Thesis,
R. V. Sampaio. Jul 73, 26p
In Portuguese.
U.S. Sales Only.

The emission-transmission method of Leroux and Mahmud, an experimental technique for compensating matrix effects in photon excited X-ray fluorescence analysis, was used to determine the concentration of lead and antimony in pellets of galalith. The effect of interfering elements was studied by adding various concentrations of mercury and tin to the respective pellets. To illustrate possible environmental applications, a number of pellets was prepared from leaves of almond trees located in different regions of Rio de Janeiro. Lead concentrations were determined for the dried leaf material and showed values ranging from 50 to 145 parts per million. (Atomindex citation 09:381814)

INIS-mf-4273 PC **A07**/MF **A01**
Universidade Federal De Minas Gerais, Belo Horizonte (Brazil). Inst. de Ciencias Exatas.
Perturbed Angular Correlation. Its Application to the Study of Hafnium 181 Complexes.
J. D. Fabris. 1977, 146p
In Portuguese.Thesis.
U.S. Sales Only.

The electric quadrupolar interaction in some hafnium complexes, measured at the metal nucleus level is studied. For that purpose, the technique of gamma - gamma perturbed angular correlation is used: the frequencies of quadrupolar interaction are compared with some hafnium alpha -hydroxicarboxilates, namely glycolate, lactate, mandelate and benzylate; the influence of the temperature on the quadrupolar coupling on the hafnium tetramandelate is studied; finally, the effects associated with the capture of thermal neutrons by hafnium tetramandelate are examined locally at the the nuclear level. The first group of results shows significant differences in a series of complexes derived from glycolic acid. On the other hand, the substitution of the protons in hafnium tetramandelate structure by some alkaline cations permits to verify a correlation between the variations in the quadrupolar coupling and the electronegativities of the substituent elements. Measurements at high temperatures show that this complex is thermally stable at 100 and 150 exp 0 C. It is possible to see the appearance of two distinct sites for the probe nucleus, after heating the sample at 100 exp 0 C for prolonged time. This fact is attributed to a probable interconversion among the postulated structural isomers for the octacoordinated compounds. Finally, measurements of angular correlation on the irradiated complex show that there is an effective destruction of the target molecule by neutron capture. (Atomindex citation 09:382343)

INIS-mf-4275 PC **A02**/MF **A01**
Instituto de Pesquisas Radioativas, Belo Horizonte (Brazil).
Analytical Methods Used at IPR (Instituto de Pesquisas Radioativas - Minas Gerais, Brazil).
C. C. Murta. 23p
In Portuguese.
U.S. Sales Only.

The analytical methods available at IPR (MG-Brazil) for the routine determination of uranium are described. These methods are: gravimetric analysis; fluorescence spectroscopy, voltametry, polarography, absorption spectroscopy, beta-and gamma-radiometric analysis, gamma spectroscopy, activation analysis, X-rays fluorescence analysis and delayed neutron analysis. Some additional methods for the study of mineral ores, such as X-rays diffractometry, emmission spectroscopy, thermal analysis, etc, are also discussed. (Atomindex citation 09:381801)

INIS-mf-4295 PC **A06**/MF **A01**
Munich Univ. (Germany, F.R.). Fachbereich Chemie und Pharmazie.
Vapour Phase Hydrolysis of Some Actinide(III) Chlorides.
H. Hauske. 4 May 77, 105p
In German.Thesis.
U.S. Sales Only.

According to a measuring method developed by Cunningham and Broido for the thermodynamical investigation of very small quantities of substance (about 1mg), the hydrolysis equilibrium constants of the reaction MCl sub 3 (solid) + H sub 2 O(gas) implies MOCl(solid) + 2 HCl (gas) were determined for the corresponding trivalent compounds of plutonium, americium, and curium (exp 239 Pu, exp 241 Am, exp 243 Am, exp 244 Cm). An apparatus was developed for this purpose which enables chlorination, hydrolysis, and X-ray investigation under the necessary conditions of smallest quantities of substance. As cause for the different hydrolysis lines for exp 241 AmCl sub 3 and exp 243 AmCl sub 3 , the different heats of decay for both isotopes and thus the self-heating of the preparate was at first considered. By means of an additional self-developed theoretical model, it could be shown, however, that only decay heats as high as that of curium 244 could slightly alter the results of the recalescence. Other parameters, however, could also clearly influence the measurements. (Atomindex citation 09:368720)

INIS-mf-4656 PC **A09**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Auger Electron Spectroscopy of Alloys.
Proefschrift (Dr.),
F. J. Kuijers. 1978, 195p
U.S. Sales Only.

This thesis describes how the surface compositions of some alloys can be determined by Auger Electron Spectroscopy (AES). The motivation for this research and the reasons for the choice of

alloy systems studied are formulated. The theoretical background of AES is briefly discussed and the apparatus used and the experimental procedures applied are described. Four alloy systems have been investigated in this thesis - Ni-Cu and Pd - Ag (consisting of a component active in most cataytic reactions - Ni and Pd; and a component which is almost inactive for a number of reactions - Cu and Ag) and Pt - Pd and Pt-Ir (consisting of two active components). Knowledge of the surface composition of the various alloy systems is shown to be essential for the interpretation of catalytic results. (Atomindex citation 10:424375)

INIS-mf-4658 PC **A08**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Relation Between Jahn-Teller Ordering and Charge Ordering. The Connection Between the Structures of KCusup(II)F Sub 3 and Cs sub 2 Ausup(I)Ausup(III)Cl sub 6.
J. C. M. van Eijndhoven. 1978, 159p
Proefschrift (Dr.).
U.S. Sales Only.

This thesis compares the structures of KCusup(II)F sub 3 and Cs sub 2 Ausup(I)Ausup(III)Cl sub 6 . Both compounds have a structure that can be thought to result from a deformation of the cubic perovskite structure. The deformation of KCusup(II)F sub 3 is a result of a cooperative Jahn-Teller effect and the deformation of Cs sub 2 Ausup(I)Ausup(III)Cl sub 6 results in two sublattices. The structures of both compounds result from a continuous phase transition from the cubic pervskite structure due to a deformation of symmetry. Using local coordinates and a calculation of the electron-lattice interaction in a static approximation, four structure types were derived. One is the structure of Cs sub 2 AuAuCl sub 6 at ambient temperature and pressure and the second contains a group of structures corresponding to the structures found for KCuF sub 3 . The third structure type was recently suggested for Cs sub 2 AuAuCl sub 6 under pressure and the fourth has not been found experimentally. Two types show a Jahn-Teller ordering and the other two charge ordering. (Atomindex citation 10:424336)

INIS-mf-4843 PC **A08**/MF **A01**
Amsterdam Univ. (Netherlands).
Solid Molecular Hydrogens in the Ordered State as Function of Density and Ortho-Para Concentration: A Far Infrared Study.
Proefschrift (Dr.),
R. Jochemsen. 6 Dec 78, 159p
U.S. Sales Only.

In this thesis, the results of far infrared absorption experiments on solid molecular hydrogen and deuterium are presented. In Chapter I an introduction to the properties of solid molecular hydrogens in given. The experimental system used for the high pressure infrared measurements and the data handling procedures are discussed in Chapter II. The theory of infrared absorption and the averaging of the dipole moment over the motion of the molecules is contained in Chapter III. In this chapter a general sum rule for the integrated absorption is derived. The remaining chapters present the results of the measurements and the discussion. In Chapter IV the author concentrates on the phonon frequencies as a function of ortho-para concentration and density, while in Chapter V measuremtns of phonon lineshape and integrated absorption intensities are presented. Finally, in Chapter VI, a study is given of the phase transition in solid hydrogen and deuterium. This study provides accurate values for the transition temperature as a function of density (in deuterium) and as a function of ortho-para concentration (in hydrogen) as well as the dependence of the order parameter on the temperature and the ortho-para concentration. (Atomindex citation 10:442420)

INIS-mf-5306 PC **A02**/MF **A01**
Technische Hochschule, Darmstadt (Germany, F.R.). Fachbereich Anorganische Chemie und Kernchemie.
Application of the Energy Dispersive X-Ray Fluorescence Analysis as a Multielement Method for Determination of Trace Elements in Silicate Samples.
R. Spatz. 1978, 3p
In German.Thesis.
U.S. Sales Only.

A simple and fast XRF-method was developed for multielement determination in silicate samples. For this two selfdeveloped measurement devices were used. The first one was a spectrometer with tube excitation and secondary targets and the second was a device for the XRF with radionuclide excitation. The two systems both showed equal performance with respect to the detection sensitivity (range of order 1 ppm). However the radionuclide excitation appears to be more advantageous in the energy range above 25 keV. The development and test of appropriate standards are described as well as the evaluation of the spectra of samples of different kind (mass absorption). The analyzing method was used in the investigation of environmental samples e.g. river sediments, suspended particles, dust and ground samples, quick ash and sludge. (Atomindex citation 10:490316)

INP-935/PS PC **A03**/MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Hyperfine Interactions of Iron Implanted into Aluminium.
B. D. Sawicka, M. Drwiega, J. Sawicki, and J. Stanek. 1976, 31p
U.S. Sales Only.

Systematical investigations of the stable exp 57 Fe implanted into Al at energies of 10 to 70 keV and doses of 10 exp 14 to 2.10 exp 17 ions/cm exp 2 were performed by means of conversion electron Moessbauer spectroscopy at room and liquid nitrogen temperatures. The spectra measured were interpreted as originating from iron monomers (single line) and from iron associations, mostly dimers (doublet). The isomer shifts of both components differ considerably and are constant against iron concentration. The ratio of both components depends strongly on the iron concentration. The quadrupole splitting of the doublet rises with the concentration, the rise being reproduced by computer simulations of efg distributions in densely packed random charge defected lattices. The annealing processes were investigated. The spectra of the Fe-Al samples made by ion implantation and by a splat-cooling technique are well comparable. (Atomindex citation 10:424419)

IPNO-T-77-05 PC **A05**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Search of the Thermodynamic Consequence of the Nephelauxetic Effect in Citric Complexes of the 4F and 5F Trivalent Elements.
S. Hubert. 1977, 99p
In French.Thesis.
U.S. Sales Only.

The measurement of citric complex formation for lanthanides and transuranium elements, from americium to fermium, reveals the double double effect for complexes which are formed in one phase. These values have been obtained with a high relative precision using the solvent extraction method. The variation in delta G exp 0 shows disorders for 3-4, 7, 10-11 f electrons which is the interelectronic repulsion symmetry for f sub-shells. These regularities originate mainly from nephelauxetic effect, when the entropic factor does not mask too much the enthalpic part in the free energy change. Double double effect is a thermodynamical consequence of nephelauxetic effect. Moreover an inner sphere complexation model has been built up. In order to establish whether this consequence leads to a stabilization or destabilization effect, a hypothesis, whether the ligand-electron would not occur, has been taken into account. The comparison of experimental and theoretical values indicates that F exp 0 parameter does not change. On the contrary, a decrease in other two-electron parameters has been pointed out. This study confirms a rather destabilizing than stabilizing nephelauxetic effect, at least for 4f elements. (Atomindex citation 09:410592)

IS-T-875 PC **A08**/MF **A01**
Ames Lab., IA.
Formation of Calcium Aluminates in the Lime Sinter Process.
K. S. Chou. Mar 80, 166p
Contract W-7405-ENG-82
Thesis.

A study of the formation of several calcium aluminates from pure components in the lime sinter process was undertaken to determine the kinetics of formation and subsequent leaching using a dilute sodium carbonate solution. The composition CaO 61.98%, SiO sub 2 26.67%, and Al sub 2 O sub 3 11.53% was used. Isothermal sintering runs of 0.2 to 10.0 h were carried out at 1200, 1250, 1300, and 1350 exp 0 C. When the sintering temperature was below the eutectic temperature (1335 exp 0 C), the ternary mixture behaved like two binary systems, i.e. CaO-Al sub 2 O sub 3 and CaO-SiO sub 2 . Only one compound, 3CaO.SiO sub 2 , was formed between CaO and SiO sub 2 . With lower sintering temperature and shorter sintering time, the beta -phase was dominant. However, when both temperature and time increased, more and more of the beta -C sub 2 S was transformed into the gamma -phase. Several different aluminates were formed during the sintering of CaO and Al sub 2 O sub 3 . The compounds CaO.Al sub 2 O sub 3 and 3CaO.Al sub 2 O sub 3 were observed at all tested sintering temperatures, while the 5CaO.3Al sub 2 O sub 3 phase was found only at 1200 exp 0 C and 12CaO.7Al sub 2 O sub 3 at 1250 exp 0 C or higher. The first compound formed between CaO and Al sub 2 O sub 3 was probably 12CaO.7Al sub 2 O sub 3 , but the amount did not increase immediately with time. The first dominant compound between CaO and Al sub 2 O sub 3 was CaO.3Al sub 2 O sub 3 . When the calcium ion diffused through the product layer of CaO.Al sub 2 O sub 3 , 3CaO.Al sub 2 O sub 3 was formed. If unreacted Al sub 2 O sub 3 were present after the formation of CaO.Al sub 2 O sub 3 , CaO.2Al sub 2 O sub 3 would form. Subsequent leaching of the sinters showed that the extractable alumina in the products increased with both sintering temperature and time, reaching a max of about 90%. These extraction data corresponded very well to the quantities of aluminates in the sinters. 59 figures, 13 tables. (ERA citation 05:014709)

IS-T-885 PC **A10**/MF **A01**
Ames Lab., IA.
Interaction and Reactivity of Nitric Oxide and Carbon Monoxide on Ruthenium Surfaces.
E. E. Quick. Mar 80, 207p
Contract W-7405-ENG-82
Thesis.

A multifaceted investigation of the reduction of nitric oxide by carbon monoxide using a ruthenium (102) single crystal catalyst in the pressure range 10 exp -3 to 10 Torr and temperature range of 300 to 475 exp 0 C has been undertaken. Kinetic and isotopic results indicate that the reaction products CO sub 2 and N sub 2 were produced via two reaction mechanisms. Using a reducing gas mixture (low P/sub NO//P/sub CO/ ratio) a two site mechanism was operative involving NO dissociation. The carbon monoxide kinetic order varied from +1 to -3 and the nitric oxide order varied from +1 to 0. The catalyst under these conditions was determined to be metallic ruthenium with oxygen bonded within the first surface layer. The oxygen was unreactive and formed a (1 x 3)-0 LEED pattern. Under oxidizing conditions (high P/sub NO//P/sub CO/ ratio) the catalyst was ruthenium dioxide and the functional mechanism under these reaction conditions yielded a nitric oxide order of +2 to -4. Inclusion of a site poisoning mechanism under reducing conditions and an RuO sub 2 growth mechanism involving ruthenium cation transfer under oxidizing conditions into the kinetic rate laws led to an overall rate law which could be fit to the carbon monoxide and nitric oxide order plots. Using isotopically oxygen labelled reactants, it was observed that the three possible isotopes of carbon dioxide were produced. A gamma -CO surface species is postulated as an intermediate in the exchange process. The reaction was observed to be initially surface structure insensitive and the reaction kinetics were derived using a Langmuir-Hinshelwood formalism. (ERA citation 05:016252)

IS-T-886 PC **A08**/MF **A01**
Ames Lab., IA.
Oxygen Reduction on a Graphite Paste and a Catalyst Loaded Graphite Paste Electrode.
D. M. DiMarco. Mar 80, 166p
Contract W-7405-ENG-82
Thesis.

Oxygen reduction was studied in basic solution at a graphite paste electrode (GPE). The GPE was used as the disk of a rotating ring disk electrode

(RRDE) and experiments were done using the voltage scan technique. The enhancements afforded by catalysts applied to the GPE were also studied. Oxygen reduction on a GPE was shown to be a two-electron process resulting in the formation of peroxide. The Tafel slope (plotted as potential versus log(i/sub l/ x i/(i/sub l/ - i))) was 180 mV. The presence of gold, silver, or platinum on the GPE shifted the oxygen reduction wave approximately 800 mV in the anodic direction. Comparison of the data on a metal catalyzed GPE to the solid metal electrode showed that the former electrode produced a greater fraction of peroxide as product than did the latter. Silver and gold catalyzed GPEs gave Tagel slopes of about 120 mV. The intermediate catalysis of iron and cobalt porphyrin was also examined. While the cobalt porphyrin catalyzed oxygen reduction at a more anodic potential than the iron porphyrin, the latter appeared more active in reacting the peroxide formed as the product of the disk reaction. (ERA citation 05:016271)

ISM-257 PC **A02**/MF **A01**
Ames Lab., IA.
Metal-Electrolyte Boundary Studies with in Situ Photoemission.
D. E. Grider, and T. E. Furtak. 1980, 18p CONF-790956-5
Contract W-7405-ENG-82
Conference on non-traditional approaches to the study of the solid-electrolyte interface, Snowmass, CO, USA, 23 Sep 1979.

The boundary between copper (111) and 0.5 M H sub 2 SO sub 4 was investigated using interfacial photoemission spectroscopy. Exploiting knowledge of electron momentum restrictions a feature in the ratio of p-polarized to s-polarized photoelectron yield was correlated with the onset of transitions to Bloch-like final states within the metal at 4.1 eV. This provided some energy specification in the electron energy integrated yield data. The quality of the interface was monitored using both clean and adsorbate (thiourea, Br exp -) covered Cu surfaces. The major effect of adsorption is attributed to a loss of conservation of electron momentum parallel to the surface during the emission process. (ERA citation 05:016165)

ISM-259 PC **A02**/MF **A01**
Iowa State Univ., Ames.
Model of the Chemistry of the Dump Leaching of Chalcopyrite.
K. C. Liddell, and R. G. Bautista. 1979, 21p CONF-791108-18
Contract W-7405-ENG-82
72. AIChE meeting, San Francisco, CA, USA, 25 Nov 1979.

A model of the reaction of chalcopyrite, CuFeS sub 2 with Fe exp 3+ and with O sub 2 is considered. Homogeneous solution phase reactions are assumed to be always at equilibrium throughout the dissolution of the mineral. The dissociation of HSO exp -4 and several complexation reactions involving Cu exp 2+ , Fe exp 2+ and Fe exp 3+ are incorporated in the model equations. The relative importance of Fe exp 3+ , O sub 2 , and H exp + as oxidants and the role of solution equilibria are assessed and the implications for leaching practice discussed. (ERA citation 05:016253)

JAERI-M-7535 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Radiation-Induced Graft Polymerization of Acrylonitrile onto Poly (Vinyl Chloride) Film in Different Solvents.
S. Hashimoto, A. Udagawa, W. Kawakami, A. Miyakawa, and Y. Nakamura. Mar 78, 43p
In Japanese.
U.S. Sales Only.

Effect of the solvent upon graft polymerization of acrylonitrile onto poly(vinyl chloride) film by simultaneous irradiation was studied. Using an electron accelerator, irradiation was made at dose rate 10 exp 5 rad/sec at room temperature. Graft concentration distribution in cross section of the film was measured by the interferometric method. Mechanical properties of the grafted film at 100 exp 0 C were measured. Initially the reaction rate increases with irradiation time, but decreases later. Graft concentration in cross section of the film is not uniform. There is a peak in the center first, which then moves toward film surface. This is possibly caused by change of the monomer concentration in the film; the concentration is determined by consumption rate of the monomer in the film and its diffusion from film surface. Young's modulus of the 20% grafted film is 3-4 times that of the ungrafted, and tensile strength and elongation are 2-3 times as high. (Atomindex citation 09:410616)

JAERI-M-7785 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Molecular Orbital Theory and Its Application to Electron Spectroscopy.
T. Sasaki, and T. Soga. Jul 78, 61p
In Japanese.
U.S. Sales Only.

The electron spectroscopy developed remarkably in recent years has provided much information on elemental cr,mpositions and electronic states of the surface layer. Molecular orbital theories frequently used in analyses of the photoelectron spectra are reviewed. The DV-X alpha method in which numerical bases are used for estimating the molecular potential in the Hartree-Fock-Slater equation is in excellent agreement with the observations. Example calculations of molecular orbital energies and density of states by this method are presented. Usefulness of the method in other fields is also indicated. (Atomindex citation 10:489050)

JINR-R-14-10934 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Application of Proportional Chamber for Quantitative and Qualitative Analysis of Thin-Layer Radiochromatograms.
Yu. V. Zanevskii, A. B. Ivanov, V. D. Peshekhonov, I. A. Tyapkin, and S. P. Chernenko. 1977, 9p
In Russian.
U.S. Sales Only.

The possibility has been studied to use multiwire proportional chambers for qualitative and quantitative analysis of radiochromatograms. It is shown that a proportional chamber, being a highly effective detector of gamma radiation, can be successfully used for fast three-dimensional analysis of radiochromatograms with a sufficient accuracy (no less than +- 10% for exp 14 C and exp 32 P). The detector sensitivity is limited with self-noises of the chamber and corresponds to 10 exp -3 1/sxmm exp 2 . This value shows that it is possible to record chromatographic zones labelled with exp 14 C and exp 32 P with a minimum activity of 10 exp 4 -10 exp 5 nCi/mm exp 2 . The preliminary results of spatial localization of the chromatographic zones labelled with exp 3 H, exp 14 C, exp 32 P isotopes are given as well as the analysis results of the activity of the zones labelled with exp 14 C and exp 32 P. (Atomindex citation 09:413739)

JINR-12-11055 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Electrophoresis and Paper Chromatography of I exp - , Br exp - , IO sub 3- , BrO sub 3- and O sub 4- in Dimethyl Formamide-Ammonia Solutions.
I. Draier, R. Draier, Yu. Norseev, and V. Khalkin. 1977, 8p
In Russian.
U.S. Sales Only.

The behaviour of iodine valent forms during electrophoresis and paper chromatography in dimethylformamide (DMF) solutions-NH sub 4 OH has been studied. The location of halogen-containing compounds on the paper strips after electrophoresis or chromatography has been determined radiometrically. In a weak-alkaline electrolyte of DMF-3M-NH sub 4 OH at a volume ratio of 1:2 between the components of the mixture a distinct separation of periodate, iodate, and iodide takes place. Upon eluation of iodine anions on the paper, a dependence of Rf (the ratio of the distance passed by the spot to that passed by the eluent front) on the solution composition is observed for iodate. (Atomindex citation 09:413800)

JINR-6-11056 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Preparation of Certain Inorganic Forms of Astatine and Study of Their Properties of Electrophoresis on Paper and Paper Chromatography.
I. Draier, R. Draier, Yu. V. Norseev, and V. A. Khalkin. 1977, 12p
In Russian.
U.S. Sales Only.

The products of oxidation of astatine were analyzed by various reagents with the aid of electrophoresis on paper. The chromatography of valency forms of astatine on paper was studied in several eluating systems. Conditions were found for oxidizing astatine to five and seven valency states. Astatine was oxidized by 2M KOCl-1M KOH; 20% solution of chloramine B-C sub 6 H sub 5 SO sub 2 NaNCl; XeF sub 2 in neutral and alkali solutions, 3x10 exp -4 M and 3x10 exp -2 M KIO sub 4 ; 0.1 M KMnO sub 4 in alkali solution. The electrophoresis of astatine compounds was conducted at 1000-1200 V in neutral or weakly alkali electrolytes: 0.1 M Na sub 2 SO sub 4 or dimethylformamide-3M NH sub 4 OH taken in a volumetric ratio of mixture components of 1-to-2. The distribution of statine on paper after electrophoresis or the chromatography was determined by scintillation counters. A comparison was made between th: behaviour of astatine and perastatine with iodate and periodate in electrophoresis on paper and paper chromatography. It was shown that perastatine is stable in alkali and neutral media, but in addition of an acid to solutions of perastatine reduces the latter to astatine. (Atomindex citation 09:413801)

K/ET-5007 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Removal of Noble Gases by Selective Absorption.
J. R. Merriman, M. J. Stephenson, B. E. Kanak, and D. K. Little. Jan 80, 20p CONF-800211-3
Contract W-7405-ENG-26
International symposium on management of gaseous wastes from nuclear facilities, Vienna, Austria, 18 Feb 1980.

Process performance and reliability have been demonstrated on an engineering scale with 10 years of pilot plant operation, including extended testing with exp 85 Kr, exp 133 Xe, and exp 131 I. The selective absorption process is based on exploitation of solubility differences which exist among the noble gases and other gas-phase constituents in a fluorcarbon solvent. Much information now exists on the solubilities of various components in CC1 sub 2 F sub 2 , which is the reference solvent, and on other aspects of this fluorocarbon system. The effects of carrier gas coabsorption and solvent vaporization/condensation on noble gas mass transfer inside the absorption and stripping zones have been determined. The effects of column size on mass transfer have also been measured and rigorous engineering models have been derived for the process hardware. Many improvements and simplifications have been made to the original version of the process, and depending upon the separation task, a variety of system configurations is possible. The selective absorption process is applicable to essentially all types of nuclear facilities, and several gas cleanup tasks have been considered. One of these, post-accident reactor cleanup, is described. (ERA citation 05:016277)

LA-8146-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Plutonium Solution Assay System Based on High-Resolution gamma-Ray Spectroscopy.
J. L. Parker. Jan 80, 16p
Contract W-7405-ENG-36

An automated, nondestructive assay system for plutonium solution samples has been designed, constructed, and tested. The assay system is based on high-resolution gamma-ray spectroscopy of the naturally emitted plutonium gamma rays. The assays are made on 20- to 30-ml samples over a wide range of plutonium concentration (approx. 0.5 g Pu/l to approx. 500 g Pu/l) with 1-sigma precision of generally less than or equal to 1% for exp 239 Pu, exp 241 Pu, and exp 241 Am in assay times of 45 min or less. When properly calibrated, bias and/or systematic error is less than or equal to 1% over the range of concentration, and the assay procedure is insensitive to the chemical

composition of the solutions. The system employs a very high resolution, moderately efficient lithium-drifted germanium gamma-ray detector to optimize the accurate extraction of the required information from the complex plutonium spectra. Also critical to the assay accuracy is the correction for sample self attenuation (based on transmission measurement through the sample by an external plutonim source) and the correction for pileup and deadtime losses (based on the constant 88.0 keV flux from a small, fixed exp 109 Cd source). Once set up and running the system is easily operated by relatively untrained personnel and the system control codes have many internal checks on the system performance and assay precision. (ERA citation 05:013953)

LBL-10292 PC **A10**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Preparation and Spectroscopic Properties of Three New Actinide (IV) Borohydrides.
R. H. Banks. Dec 79, 209p
Contract W-7405-ENG-48
Thesis.

New tetrakis-borohydrides of Pa, Np, and Pu have been synthesized. The crystal structure of Pa(BH sub 4) sub 4 is isostructural to those of Th(BH sub 4) sub 4 and U(BH sub 4) sub 4 and is of the tetragonal space group P4 sub 3 2 sub 1 2, where a = 7.53 (3) A, c = 13.22 (5) A, and Z = 4. Its calculated density is 2.57 gm-cm exp -3 . Pa(BH sub 4) sub 4 is an orange, air-sensitive compound which is soluble in THF and sublimes at 55 exp 0 in vacuum. Due to the thermal instabilities of Np(BH sub 4) sub 4 and Pu(BH sub 4) sub 4 , their reaction temperatures are maintained at 0 exp 0 and the compounds must be stored at low temperature. Low temperature x-ray diffraction studies have shown that Np(BH sub 4) sub 4 and Pu(BH sub 4) sub 4 are isomorphous and exhibit a unique crystal structure which is very similar to that of Zr(BH sub 4) sub 4 . The details of this new structure were determined by single crystal x-ray diffraction methods at 130K for Np(BH sub 4) sub 4 . Neptunium borohydride is monomeric and crystallizes into the tetragonal space group P4 sub 2 / nmc, where a = 8.559 (9) A, c = 6.017 (9) A, and Z = 2. The 12 coordinate Np atom is triply hydrogen-bridged bonded to four terminal BH sub 4-groups disposed tetrahedrally around it giving Np-B distances of 2.46 (3) A. Solid-state, low temperature infrared (25-7400 cm exp -1) and Raman (100-2600 cm exp -1) spectra were taken for Np(BH sub 4) sub 4 and Np(BD sub 4) sub 4 . A normal coordinate analysis was carried out using the assigned fundamental frequencies obtained from the spectra and determined a reasonable set of force constants and calculated values for the frequencies of the unobserved T sub 1 modes. Based on results of the analysis, isotopic impurity, overtone, and combination bands were identified in the infrared spectra. (ERA citation 05:014001)

LBL-10309 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Effect of CO sub 2 Pressure on the Rate of Decomposition of Calcite (CaCO sub 3).
T. Darroudi. Jan 80, 22p
Contract W-7405-ENG-48
Thesis.

The Langmuir method was employed to measure the rate of CO sub 2 escape from (1011) cleavage surfaces of calcite (CaCO sub 3) single crystals at temperatures from 893 exp 0 K to 1073 exp 0 K and at background pressures of CO sub 2 from 10 exp -5 P/sub eq/ to 4 x 10 exp -2 P/sub eq/, where P/sub eq/ is the equilibrium decomposition pressure. Rates of decomposition measured in vacuum were in good agreement with earlier studies carried out under similar conditions. The rates were relatively sensitive to the CO sub 2 pressure at pressures of the order of 10 exp -2 P/sub eq/, but were essentially independent of CO sub 2 pressure for a range of lower pressures that cause a flux of CO sub 2 gas against the CaCO sub 3 sample surface up to about 10 exp 3 times the flux that leaves the CaCO sub 3 in vacuum. In this latter CO sub 2 pressure range, the rate limiting process is probably a solid state diffusional step or surface step of CO sub 2 . The rate limiting process at CO sub 2 pressures near P/sub eq/ must be different, but more data are needed to determine what that process may be. (ERA citation 05:012224)

NDRL-2080 PC **A03**/MF **A01**
Notre Dame Univ., IN. Radiation Lab.
Radiation Laboratory Quarterly Report, October 1, 1979-December 31, 1979.
15 Jan 80, 41p
Contract EY-76-C-02-0038

Investigations include: role of electron-phonon interaction in absorption spectra of trapped electrons; solvated electrons;energy loss process of slow electrons in matter; physical and chemical processes in irradiated liquefied rare gases; electron thermalization in neon, argon, krypton, xenon, and diatomic molecules; the effect of time-dependent activation energy on electron hopping transport; CO desorption and adsorption on Pt(111); studies of electron attachment to O sub 2 at low temperatures; theoretical identification of a radical produced by radiolysis of uracil; evidence for dynamic coupling in the molecular vibrations of crystalline meta-dinitrobenzene; the vibrational factor group splitting in crystalline aniline; absolute calibration of the thiocyanate pulse radiolysis dosimeter; rates and mechanisms of oxidation of substituted alkyl radicals by Ir(IV), Fe(III), and Mn(VII) in aqueous solutions; oxidation of hexachloroiridate(III) by Cl sub 2 - and Br sub 2 -; radiolysis of vinylsulfonic acid; intramolecular electron transfer in nitrobenzyl halides; radiation chemistry studies with heavy ions; and charge transfer photochemistry of Cu(II) complexes with Schiff bases. Abstracts of papers and reports published during the quarter are included. (ERA citation 05:012255)

N80-21463/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Rate Constant for the Reaction of Hydroxyl Radical with Formaldehyde over the Temperature Range 228-36 K.
L. J. Stief, D. F. Nava, W. A. Payne, and J. V. Michael. Mar 80, 17p NASA-TM-80866

Absolute rate constants for the reaction OH + H2CO measured over the temperature range 228-362 K using the flash photolysis-resonance fluorescence technique are given. The results are independent of variations in H2CO concentration, total pressure Ar concentration, and flash intensity (i.e., initial OH concentration). The rate constant is found to be invariant with temperature in this range, the best representation being k sub 1 = (1.05 + or - 0.11) x 10 to the 11th power cu cm molecule(-1) s(-1) where the error is two standard deviations. This result is compared with previous absolute and relative determinations of k sub 1. The reaction is also discussed from a theoretical point of view.

N80-21611/2 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
An Investigation into the Real Gas Effects of Cryogenic Nitrogen in Inviscid Homentropic Flow.
C. M. Albone. May 79, 18p RAE-TM-AERO-1805, BR68895

The real gas effects of nitrogen at low temperatures are examined in terms of its use as a test gas in a high Reynolds number transonic wind tunnel. Inviscid, isentropic flow of a nonconducting gas is studied with the use of a simplified equation of state which enables an expression for enthalpy (and hence the terms in Bernoulli's equation) to be derived by analytic integration.

N80-21718/5 PC **A09**/MF **A01**
Bristol Univ. (England). Dept. of Mechanical Engineering.
Electrohydrodynamics: A Study of Mass Transfer in Unipolar Electrophoretic Flows.
Ph.D. Thesis.
R. W. L. Snaddon. Nov 78, 184p

Discs of ion-exchange membrane were used to generate single streamer electrophoretic flows in n-hexane by the localised injection of unipolar charge in a plane parallel plate electrode system. The mass transfer properties of these flows was investigated with the aid of a laser-Doppler-anemometer. Polymethylmethacrylate lattices were used as light scattering particles in the anemometer studies and in photographic flow visualisation work. The electrophoretic flows exhibited a well ordered streamer structure with diameters similar to those of the charge emitters. Flow velocities of 20mm per sec were recorded with applied fields up to 200,000 Vm and streamer mass transfer varied nonlinearly with electrical power input. Velocity profiles of streamers at applied fields up to 37,500 Vm were used to estimate the efficiency of the electrophoretic mass transfer process which was found to be low (10 percent - 23 percent). Reasons for this are examined in the light of the charge, fluid, field and flow interactions, mobility, viscosity, current and voltage in the mass transfer process.

N80-21997/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
User's Guide for Vectorized Code EQUIL for Calculating Equilibrium Chemistry on Control Data Star-100 Computer.
A. Kumar, R. A. Graves, Jr., and K. J. Weilmuenster. Apr 80, 33p NASA-TM-80193, L-13342

A vectorized code, EQUIL, was developed for calculating the equilibrium chemistry of a reacting gas mixture on the Control Data STAR-100 computer. The code provides species mole fractions, mass fractions, and thermodynamic and transport properties of the mixture for given temperature, pressure, and elemental mass fractions. The code is set up for the electrons H, He, C, O, N system of elements. In all, 24 chemical species are included.

ORO-4703-18 PC **A03**/MF **A01**
Tennessee Univ., Knoxville. Dept. of Physics and Astronomy.
Electron Attachment to Chlorofluoromethanes Using the Electron Swarm Method.
D. L. McCorkle, A. A. Christodoulides, L. G. Christophorou, and I. Szamrej. 1979, 38p
Contract EY-76-S-05-4703

Electron attachment rate constants, as a function of pressure-reduced electric field were measured in mixtures with nitrogen for CCl sub 3 F, CCl sub 2 F sub 2 , and CClF sub 3 using the electron swarm method. From these data total electron attachment cross sections, sigma/sub a/(epsilon), as a function of electron energy, epsilon, were determined for the chlorofluoromethanes using the electron-swarm unfolding technique and a new set of electron energy distribution functions for N sub 2 . For CCl sub 3 F and CCl sub 2 F sub 2 three maxima in sigma/sub a/(epsilon) were found at thermal energy, 0.25, and 0.75 eV and at 0.07, 0.30, and 0.93 eV, respectively. Only one pronounced maximum in sigma/sub a/(epsilon) for CClF sub 3 was observed at 1.4 eV. The thermal values of the attachment rate constant for CCl sub 3 F, CCl sub 2 F sub 2 , and CClF sub 3 are, respectively, 3.90 x 10 exp 8 , 4.00 x 10 exp 7 , and 6.05 x 10 exp 3 sec exp -1 torr exp -1 . Additionally, comparisions are made between the sigma/sub a/(epsilon) calculated for these and other molecules using both the new electron energy distribution functions for N sub 2 and those determined earlier. Substituent effects on the number and position of negative ion resonances and on the magnitude of sigma/sub a/(epsilon) for the chlorofluoromethanes are discussed. (ERA citation 05:017000)

ORO-5572-2 PC **A04**/MF **A01**
Old Dominion Univ., Norfolk, VA. Dept. of Oceanography.
Fate of Chlorine in Seawater. Progress Report, October 1, 1978-October 31, 1979.
G. T. F. Wong. Nov 79, 52p
Contract EE-77-S-05-5572

Investigations on the effects of the concentration of bromide ion, temperature and sunlight on the rate of consumption of chlorine in seawater were performed. In addition, the analytical chemistry of residual chlorine in seawater, the effect of organic compounds in seawater in various molecular weight size fractions, and the effect of ammonia on the rate of consumption of chlorine in seawater were studied. (ERA citation 05:012522)

PATENT-4 162 142
Not available NTIS
Department of Energy, Washington, DC.

Tritium Labeling of Organic Compounds Deposited on Porous Structures.
Patent,
R. E. Ehrenkaufer, A. P. Wolf, and W. C. Hembree. Filed 29 Jun 78, patented 24 Jul 79, 6p PAT-APPL-920 412
Supersedes PAT-APPL-920 412-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An improved process for labeling organic compounds with tritium is carried out by depositing the selected compound on the extensive surface of a porous structure such as a membrane filter and exposing the membrane contaning the compound to tritium gas activated by the microwave discharge technique. The labeled compound is then recovered from the porous structure. (ERA citation 05:021000)

PB80-170186 Not available NTIS
National Bureau of Standards, Washington, DC.
Nuclear Magnetic Resonance in LaNi5.
Final rept.,
M. Rubenstein, L. J. Swartzendruber, and L. H. Bennett. Mar 79, 3p
Pub. in Jnl. of Applied Physics 50, n3 p2046-2048 Mar 79.

Proton and La(139) nuclear magnetic resonance measurements have been performed on LaNi5, LaNi5 hydrides, and LaNi5H(x) with ternary additions. With ternary additions, the activation energy for proton diffusion remained unchanged, but the motionally narrowed linewidth broadened. The quadrupole interaction on the La site has been determined in LaNi5 and LaNi5H(x).

PB80-170194 Not available NTIS
National Bureau of Standards, Washington, DC.
Near-Wing Asymmetries of the Self-Broadened First Rb and Cs Resonance Lines.
Final rept.,
K. Niemax, M. Movre, and G. Pichler. 1979, 6p
Sponsored in part by Deutsche Forschungsgemeinschaft, Bonn-Bad Godesberg (Germany, F.R.).
Pub. in Jnl. of Physics B 12, n21 p3503-3509 1979.

The authors have measured small asymmetries in the near wings of the self-broadened first resonance lines of Rb and Cs. The transitions from the impact to the quasi-static profile were observed. A comparison with recent calculations by Movre and Pichler reveals satisfactory agreement.

PB80-170269 Not available NTIS
National Bureau of Standards, Washington, DC.
Interaction of Nitrous Oxide with Ruthenium (1010).
Final rept.,
R. Klein, and R. Siegel. 1980, 13p
Pub. in Surface Science 92, p337-349 1980.

The reactions of nitrous oxide with ruthenium as observed on the Ru(1010) surface occur in two modes. Scission of the O-N2 bond with chemisorption of oxygen and release of molecular nitrogen to the gas phase is one, and breaking of both the O-N and N-N bonds in O-N-N with chemisorption of both O and N is the other. Energetic considerations lead to the conclusion that the latter mode is a concerted reaction. Site exclusion by preadsorption of oxygen or carbon monoxide inhibits the reaction, and where sufficient amounts of either of these two adsorbates are present, the activity of the surface can be reduced to zero. N2O can produce ruthenium oxide on the surface at sufficiently high temperatures, pressures, and contact times.

PB80-171101 Not available NTIS
National Bureau of Standards, Washington, DC.
Hyperfine Splitting of the (13)CH4 Line at 3.39 micrometers Observed by Laser-Saturated Absorption.
Final rept.,
K. Uehara, and J. L. Hall. Jul 79, 2p
Sponsored in part by National Science Foundation, Washington, DC.
Pub. in Journal of Optical Letter 4, n7, p214-215, Jul 79.

The hyperfine splitting and the recoil doubling of the F2 component in the P(6) line of the nu(3) band of (13)CH4 was resolved with a narrow linewidth of less than 1 kHz (HWHM). Positions of the hyperfine components were precisely determined and related to the absolute frequency frame.

PB80-173560 PC **A03**/MF **A01**
Missouri Water Resources Research Center, Rolla.
Analysis of Rivers and Streams of Southern Missouri for EPA Priority Pollutants Using Liquid Chromatography.
Rept. for Oct 77-Dec 79,
James O. Stoffer, and Craig M. Ratkey. Mar 80, 35p W80-04598, OWRT-A-104-MO(1)
Contracts DI-14-34-0001-8027, DI-14-34-0001-9027

The authors compare two methods of trace enrichment of organic pollutants likely to be found in rivers, streams and wastewater of Southern Missouri. Recovery data indicates sub parts per billion concentration levels are detectable with one method while a 15 minute on site enrichment at the sub parts per million level is possible with the other method. Various means of identification along with their lower concentration limits are also discussed. Among these identification methods discussed are GC/MS/DS, conventional U.V. analysis, rapid scan U.V. spectrophotometry, and high pressure liquid chromatography with data handling capabilities.

PB80-173966 PC **A07**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Enzymatic Transformations of Lignin.
Final rept. 1 Jul 76-30 Jun 79,
Stephen W. Drew, Wolfgang G. Glasser, and Philip L. Hall. 15 Nov 79, 150p NSF/RA-790365
Grant NSF-AER76-11050
See also Summary report, PB80-118458.

Research activities are reported for an interdisciplinary project which examines biological approaches to the utilization of lignin. The study explores the microbiology and embryology of lignin biodegradation; identifies and characterizes enzymes involved in the degradation of lignin; and assesses the feasibility of transforming polymeric lignin preparations via microbiological and/or enzymatic means into useful raw materials for the manufacture of chemicals and materials. These studies aim to create new knowledge in microbiology, enzymology, microbiological engineering, and chemical wood technology. The report focuses on three research areas: (1) biochemical engineering with respect to fermentation parameters, multistage lignin fermentations, and assay of lignolytic efficiency; (2) wood chemistry studies on selection and preparation of lignin samples, with an analysis technique including NMR spectroscopy; and (3) enzymology as related to lignolytic enzymes, lignin-protein associative interactions and hypotheses.

PB80-174311 PC **A05**/MF **A01**
California Univ., Los Angeles. School of Engineering and Applied Science.
The Effect of Feedwater Pretreatment Chemicals on the Performance and Durability of Reverse Osmosis Membranes.
Final rept.,
J. W. McCutchan, and Julius Glater. 31 Jan 80, 78p UCLA-ENG-8004, W80-04596, OWRT-R-0049(7810)(1)
Contract DI-14-30-0001-7810
Also pub. as California Univ., Davis. Water Resources Center Rept. no. UCAL-WRC-71.

The sensitivity of commercial reverse osmosis membranes has been studied in a variety of chemical environments. Membranes were supplied by five manufacturers representing three general types. These are cellulose acetate, thin film composite polyamide and homogeneous polyamide. Pretreatment chemicals consisted of halogens, ozone, and chlorine dioxide. Membrane exposure was conducted by soak tests in buffer solutions over a pH range of 3.0 to 8.6 and concentrations between 1.0 and 125 ppm. Assessment of membrane damage was carried out by performance testing in a flat plate laboratory reverse osmosis unit using 5000 ppm sodium chloride feed solution. Chemical attack on membrane polymer was indicated by an increase in water flux and a decrease in salt rejection. Cellulose acetate membranes were the most resistant to chemical attack. They responded only to ozone and were also hydrolized at low pH. Polyamide membranes were sensitive to ozone, halogens, and chlorine dioxide. They were also hydrolized but at low pH. The activity of all chemical agents tested was responsive to solution pH. This factor controls the distribution of halogen molecular and ionic species and consequently the rate and possibly the mechanism of membrane attack. Under conditions which maximize damage, the order of activity of chemicals under study were O3 > ClO2 > Cl2 > Br2 > I2.

PB80-174394 PC **A10**/MF **A01**
Westgate Research Corp., West Los Angeles, CA.
An Investigation into the Chemistry of the UV-Ozone Purification Process.
Final rept.,
Eriks Leitis. 8 Feb 80, 219p NSF/RA-800023
Grant NSF-ENV76-24652
See also report dated 31 Jan 79, PB-296 485.

The synergistic effect of ozone and UV light in the decomposition of organic compounds in water is studied. The nature and quantities of oxidation products by ozonation, UV-ozonation, and hydroxyl radical oxidation were assessed to understand the UV-ozonation mechanism. Nitrobenzene was selected as the primary model compound due to its relative resistance to UV-ozonation. This model compound followed an identical sequence of reactions in both O3 and UV/O3 oxidation via mono-, di-, and trihydroxylation of the benzene ring; the major stable intermediates were oxalic acid, formic acid, and glyocal. The ratios of O-, M-, and p-R-phenols produced by ozonation and UV-ozonation of nitrobenzene and chlorobenzene (a secondary model compound) were almost identical and very different from the isomeric phenol ratios given by Fenton's reagent and H2O2/UV systems. Various mono-, di-, tri-, and tetra-substituted benzene derivatives were studied using the oxidation regimes; the kinetics were determined to be pseudo-first order. A hypothesis was advanced that ozone can act also as a nucleophilic reagent towards benzene derivatives with electron withdrawing substituents. The initial work of the pH study has been completed, namely, the effect of very high and very low pH values on the rates of UV-ozonation and ozonation of selected model compounds.

PB80-175458 PC **A04**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Sampling and Analysis of Selected Toxic Substances. Task 2: Analysis for Semivolatile Brominated Organics in Fish and Turtles.
Final rept.,
M. D. Erickson, K. B. Tomer, J. T. Bursey, M. A. Moseley, and E. D. Pellizzari. Feb 80, 72p RTI/1706/02-F, EPA-560/13-80-006
Contract EPA-68-01-5020
See also Task 1, PB80-128150.

Fish and turtle (5 from Arkansas and 3 from Louisiana) caught downstream of the brominated organic chemical industry near El Dorado, AR were extracted, cleaned up, and analyzed by GC/MS for brominated organics using full scan and single ion monitoring electron impact GC/MS and negative ion chemical ionization GC/MS. PBBs (C12H4Br6 and C12H3Br7) were identified in one sample and several other brominated compounds were tentatively identified in several samples. Due to the high levels of interferences and very low levels of the compounds of interest, further identifications were impossible. The compounds were not quantitated, but levels appear to be much less than 1 ppm.

PB80-176373 PC **A04**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Sampling and Analysis of Selected Toxic Substances. Task 1: Polybrominated Biphenyls in Air and Soil at User Sites.
Final rept. 28 Dec 78-5 Jun 79,
R. A. Zweidinger, and E. D. Pellizzari. Feb 80, 55p EPA-560/13-80-005
Contract EPA-68-01-5020

Field sampling for air and soil was conducted in the vicinity of two Borg Warner Co. facilities - one in Oxnard, CA and the other near Parkersburg, WV.

Polybrominated biphenyls (PBBs) were found in all of the soil samples from Oxnard with the highest levels (36,000 microgram/kg) nearest the facility and the lowest (5 microgram/kg) upwind the greatest distance. No PBBs were found in any of the air samples (<3 ng/cu m). Polybrominated biphenyls were confirmed in seven of the thirteen soil samples from West Virginia (up to 12 microgram/kg) traces detected but not confirmed in three, and no PBBs were detected in the other three. The highest levels were from samples collected in the Ohio River basin especially along the eastern bank. No PBBs were confirmed in the air samples (<4 ng/cu m).

PB80-177058 PC **A02**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC.
Remote Measurement of Gaseous Pollutant Concentrations Using a Mobile Fourier Transform Interferometer System,
William F. Herget, and James D. Brasher. 13 Jul 78, 20p EPA-600/J-79-065
Pub. in Applied Optics, v18 n20 p3404-3420, 15 Oct 79.

A commercial Fourier transform interferometer system with telescopic optics has been installed in a van and used to make long-path absorption and single-ended emission measurements of gaseous pollutant concentrations at a number of geographical locations. The system covers the infrared spectral region from 650 to 6000/cm at a maximum resolution of 0.06/cm. For many pollutants, concentrations in the 1-10 parts per billion range can be detected over a 1 kilometer path length. To date, measurements have been made in the absorption mode across fertilizer plant gypsum ponds, an oil refinery, and jet engine plumes; industrial stacks, waste gas flares, and jet engine plumes have been studied in the emission mode.

PINSTECH/HP-16 PC **A02**/MF **A01**
Pakistan Inst. of Nuclear Science and Technology, Rawalpindi. Health Physics Div.
Determination of Uranium in Urine by Fluorometry.
M. Afsar, A. Aziz, and M. A. Mubarak. 1978, 16p
U.S. Sales Only.

The report describes fluorometric determination of traces of uranium in the urine of mine workers and persons handling uranium. After preliminary treatment uranium is extracted by solvent extraction with TBP:MIBK mixtures. An aliquot of the extracted solution is fused with high carbonate flux at 650 exp 0 C in platinum dishes. The fluorescence of fused sample is measured using a fluorometer. Various fusion parameters are discussed. The procedure for the operation and calibration of fluorometer is also described. (Atomindex citation 09:413635)

PUC-TN-1/78 PC **A02**/MF **A01**
Pontificia Univ. Catolica do Rio de Janeiro (Brazil). Inst. de Fisica.
Uncertainties in Elemental Quantitative Analysis by PIXE.
E. C. Montenegro, G. B. Baptista, A. S. Paschoa, and C. V. B. Leite. Feb 78, 15p
U.S. Sales Only.

The effects of the degree of non-uniformity of the particle beam, matrix composition and matrix thickness in a quantitative elemental analysis by Particle Induced X-ray Emission (PIXE) are discussed and the criteria to evaluate the resulting degree of uncertainty in the mass determination by this method is established. (Atomindex citation 09:413699)

RD-B-N-4364 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Energy Deposition, Isotopic Exchange and Primary Yields in the Radiolysis of Nitrogen.
D. R. McCracken. Aug 78, 28p
U.S. Sales Only.

Radiolysis of nitrogen produces reactive excited species which can cause nitriding or production of nitric acid in nuclear reactors. All the existing data on radiation induced isotopic exchange in nitrogen is reviewed, and detailed mechanisms are proposed to explain the results. It is demonstrated that exchange in pure nitrogen occurs via a chain reaction, and the data suggests that N exp + is the probable chain carrier. This chain reaction shows a strong temperature dependence. Exchange in helium-nitrogen mixtures also proceeds by a chain mechanism but this shows less dependence on temperature. If the initial formation of N exp + from a nitrogen excited state is temperature dependent, then the two mechanisms may be identical. Chain reactions do not occur with argon or neon. It is concluded that argon is the best gas to use when it is desired to purge gases from nuclear installations, since at low concentrations of nitrogen, the excited argon species are deactivated before reaction with nitrogen can occur. The formation of excited nitrogen species is therefore prevented. No quantitative data on primary yields can be directly obtained from present results on isotopic exchange or energy transfer, but the results are compatible with theoretical and semi-empirical calculations. (Atomindex citation 10:476179)

UCD-472-502 PC **A03**/MF **A01**
California Univ., Davis. Radiobiology Lab.
Size Dependence of the Physical and Chemical Properties of Coal Fly Ash.
G. L. Fisher, and D. F. S. Natusch. 1979, 50p
Contract EY-76-C-03-0472

The size dependence of physical and chemical properties of coal fly ash is reviewed. Because the size dependence of many of the chemical properties results from surface-associated chemical phenomena, a detailed description of surface analysis is provided. An understanding of the bioenvironmental significance of ambient fly ash requires a detailed understanding of its chemical reactivity and biological interactions with fly ash surfaces. This report reproduces the material found in a chapter published by Academic Press (In Analytical Methods for Coal and Coal Products, Vol. III, C. Karr, editor, pp.489-541). (ERA citation 05:016475)

UCRL-Trans-11546 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Volatility of Mendelevium and its Binary Compounds. I.
I. Zvara, V. Z. Belov, V. P. Domanov, B. L. Zhuikov, and T. Reetts. Dec 79, 15p
Contract W-7405-ENG-48
Translation source information not available.

The evaporation of metallic mendelevium from molten lanthanum at a temperature of 1150 exp 0 C has been investigated and compared with the behavior of a series of lanthanide and actinide elements. Mendelevium and fermium have a higher volatility than californium and bivalent lanthanides. The isotope exp 256 Md was produced by bombarding a exp 249 Bk target with 125 MeV exp 22 Ne ions. The effective cross section for the reaction was about 3 x 10 exp -30 cm exp 2 . (ERA citation 05:016279)

USIP-79-08 PC **A04**/MF **A01**
Stockholm Univ. (Sweden). Institutionen foer Teoretisk Fysik.
Topics in Molecular Mechanics.
H. Essen. May 79, 63p
U.S. Sales Only.

This report is a personal review of theoretical research concerning molecules. Here one finds some mathematical background from tensor calculus and Lie group theory. The most general transformations of the 3N-dimensional Laplacian, including transformations to group operators, are also presented. I discuss kinematical questions, especially those behind the separations of electronic and nuclear and of vibrational and rotational motion. One also finds discussions of the dynamics of the former separation. Classical atom-diatomic molecule scattering and quasiclassical transition probabilities are touched upon. I present a general discussion of approximate separation schemes, especially adiabatic, and discuss predissociations with special reference to one in SiO. Finally, a simple model is presented which reveals what happens when inversion doubling is connected with decay. (Atomindex citation 10:488794)

7E. Radio and Radiation Chemistry

CENA-BT-009 PC **A02**/MF **A01**
Centro de Energia Nuclear na Agricultura, Piracicaba (Brazil).
Physical Characteristics of Principal Radioisotopes Used in Biological Sciences.
V. F. Nascimento Filho. 17 Feb 77, 8p
In Portuguese.
U.S. Sales Only.

A table, with physical characteristics of radioisotopes used in biological sciences is presented. It includes data of half-life, decay, electron capture, isomeric transitron, etc. (Atomindex citation 09:414050)

CNEA-426 PC **A02**/MF **A01**
Comision Nacional de Energia Atomica, Buenos Aires (Argentina).
Synthesis and Labelling of Hydroxylapatite with exp 32 P.
O. J. Santanatoglia. Oct 76, 11p
In Spanish.
U.S. Sales Only.

In the present work two methods are compared to obtain Hydroxylapatite (Ca sub 10 (PO sub 4) sub 6 (OH) sub 2) in a synthetic way, with similar results in their efficiency and purity. One of those methods is based on the one of H. Hayer and W. Stadlmann (1955) modified, and the other one consists of a synthesis using H sub 3 PO sub 4 , CaCl sub 2 and NaOH. In this case two ways are presented related with the moment in which the alcalinization is carried out. Referring to the procedure of labelling, carrier free exp 32 P is incorporated by isotopic exchange to the H sub 3 PO sub 4 , which afterwards is used in the preparation of the hydroxylapatite. (Atomindex citation 10:422997)

FRNC-TH-825 PC **A05**/MF **A01**
Paris-11 Univ., Orsay (France).
Yield and Properties of Solvated Electrons Created by Hexamethylphosphorictriamide gamma Radiolysis.
M. C. Lebas. 1977, 83p
In French.Thesis.
U.S. Sales Only.

Hexamethylphosphorictriamide was irradiated by gamma rays to investigate the reactivity of electrons by using different scavengers. Parabromophenol and nitrous oxide were used to study the yield in solvated electrons. The G values are: H sub 2 1.15+-0.15, N sub 2 or Br exp - 4.4+-0.4 and CH sub 4 0.18+-0.05. (Atomindex citation 10:490487)

INIS-mf-4330 PC **A02**/MF **A01**
Technische Univ. Munich (Germany, F.R.). Fachbereich Maschinenwesen.
Luminescence Yield in Irradiating Gases by X-Rays and alpha Particles.
Diss. (D.Eng.),
D. Combecher. 19 Nov 73, 16p
In German.
U.S. Sales Only.

In this paper, the measurable light emission in the irradiation of gases as model substances has been quantitatively determined. The gases Ar, H sub 2 , N sub 2 , air, and C sub 3 H sub 8 were irradiated with X-rays and alpha -particles at a pressure of 730 torr. The emitted light was measured in the spectral range between the short-wave absorption edge of the gases and 6000 A (spectral resolution: 20 A). The spectral light yield was determined from the efficiency of the apparatus and from the total energy absorbed in the gases. (Atomindex citation 09:391234)

JINR-R-1-12084 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Effect of Electronic Structure of Substituted Hydrocarbons on Atomic Capture of Negative Muons.
V. S. Evseev, V. S. Roganov, M. V. Frontas'eva, Yu. V. Obukhov, and N. I. Kholodov. 1979, 13p
In Russian.
U.S. Sales Only.

Studied were relative probabilities of capture of negative muons by hydrogeneous fragments and

by substitute atoms in the Csub(n)Hsub(2n+1)Cl aliphatic chloralkyls. The influence of molecular structure of compounds on muon distribution between functional and core groups was established. Chemical effect results in relative increase of probability of muon capture by hydrocarbon radical atoms. The effect is considered from the point of view of sensibility of muons to electronic affinity, to distribution of effetive charges and inductive influence of substituents. Evaluated are relative shell contributions to the e exp - - mu exp - substitution of valent and core electrons in chloralkyls which change adiabatically with the increase of hydrocarbon chain length. It is shown that valent electrons are substituted two times more effectively by negative muons as compared to core electrons, when a number of links in a chain is more than four. (Atomindex citation 10:488795)

PB80-175102 PC **A16/MF A01**
Systems Applications, Inc., San Rafael, CA.
Modeling of Simulated Photochemical Smog with Kinetic Mechanisms. Volume 1. Final Report.
Rept. for Jul 78-Sep 79,
G. Z. Whitten, J. P. Killus, and H. Hogo. Feb 80, 364p EF79-124, EPA-600/3-80-028A
Contract EPA-68-02-2428
See also PB-290 507.

Mechanisms that describe the formation of photochemical smog are developed using a computer modeling technique directed toward the simulation of data collected in two smog chambers: an indoor chamber and a dual outdoor chamber. The results of simulating 164 different experiments are presented in Vol. 1. Individual compounds for which specific experiments were simulated and mechanisms developed include the following: formaldehyde, acetaldehyde, ethylene, propylene, butane, and toluene. Experiments in both chambers were simulated for all these compounds. The mechanisms reported describe the decay of the precursor organic compound, formation and decay of secondary organic compounds, conversion of nitrogen oxides, formation of nitrates, and the appearance and decay of ozone. Special emphasis is given to the chemistry of toluene. Also included is a study of a generalized smog-based or carbon-bond mechanism developed in a previous study.

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A083 082/8 Not available NTIS
Institute for Marine Environmental Research Plymouth (England)
Physiological Adaptation of Mytilus edulis to Cyclic Temperatures,
J. Widdows. 11 Nov 75, 14p
Availability: Pub. in Jnl. of Comparative Physiology B, v105 p115-128 1976 (No copies furnished by DTIC).

No abstract available.

AD-A083 083/6 Not available NTIS
Institute for Marine Environmental Research Plymouth (England)
Primary Production in an Estuarine Environment: a Comparison of in situ and Simulated in situ 14C Techniques,
Anna Head. 29 Aug 75, 4p
Availability: Pub. in Estuarine and Coastal Marine Science, v4 p575-578 1976 (No copies furnished by DTIC).

No abstract available.

AD-A083 084/4 Not available NTIS
Institute for Marine Environmental Research Plymouth (England)
The Occurrence of Mytilicola Intestinalis Steuer, an Intestinal Copepod Parasite of Mytilus, in the South-West of England,
J. T. Davey, and J. M. Gee. 1976, 10p
Availability: Pub. in the Jnl. of the Marine Biological Association of the United Kingdom, v56 p85-94 1976 (No copies furnished by DTIC).

No abstract available.

AD-A083 085/1 Not available NTIS
Institute for Marine Environmental Research Plymouth (England)
The Physiological Ecology of Mytilus californianus Conrad. 1. Metabolism and Energy Balance,
B. L. Bayne, C. J. Bayne, T. C. Carefoot, and R. J. Thompson. 27 Aug 75, 18p
Grant NSF-GB-29315
See also AD-A083 086.
Availability: Pub. in Oecologia v22 p211-228 1976 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 086/9 Not available NTIS
Institute for Marine Environmental Research Plymouth (England)
The Physiological Ecology of Mytilus californianus Conrad. 2. Adaptations to Low Oxygen Tension and Air Exposure,
B. L. Bayne, C. J. Bayne, T. C. Carefoot, and R. J. Thompson. 27 Aug 75, 22p
Grant NSF-GB-29315
See also AD-A083 085.
Availability: Pub. in Oecologia, v22 p229-250 1976 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 146/1 PC **A02/MF A01**
Woods Hole Oceanographic Institution MA
Distinctive Characteristics of Underwater Calls of the Harp Seal, Phoca groenlandica, during the Breeding Season,
William A. Watkins, and William E. Schevill. 2 Apr 79, 11p Rept nos. WHOI-79-86, WHOI-CONTRIB-4211
Contract N00014-74-C-0262
Pub.in Jnl. of the Acoustical Society of America, v66 n4 p983-988 Oct 79.

No abstract available.

AD-A083 149/5 PC **A02/MF A01**
Florida State Univ Tallahassee Dept of Oceanography
A Redescription of Two Species of 'Iiyarachna' (Asellota: Janiroidea) from off California (Crustacea; Isopoda),
David Thistle. Jun 78, 7p Rept no. 168
Contract N00014-75-C-0201
Pub. in Zoological Jnl. of the Linnean Society, v67 p381-386 Dec 79.

No abstract available.

AD-A083 258/4 Not available NTIS
Institute for Marine Environmental Research Edinburgh (Scotland)
The Continuous Plankton Recorder Survey: Plankton in the ICNAF Area, 1961-71, with Special Reference to 1971,
G. A. Robinson, J. M. Colebrook, and G. A. Cooper. 1975, 11p
Availability: Pub. in International Commission for the Northwest Atlantic Fisheries Research Bulletin, N11 p61-71 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 271/7 Not available NTIS
National Research Council of Canada Halifax (Nova Scotia) Atlantic Regional Lab
The Life History of Gigartina stellata (Stachk.) Batt. (Rhodophyceae, Gigartinales) in Culture,
L. C.-M. Chen, T. Edelstein, and J. McLachlin. 21 May 74, 8p Rept no. NRCC-14146
Availability: Pub. in Phycologia, v13 n4 p287-294 1974 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 406/9 PC **A03/MF A01**
Woods Hole Oceanographic Institution MA
Phytohydrography, Gulf Stream Rings, and Herbivore Habitat Contrasts.
Technical rept.,
Peter B. Ortner, Edward M. Hulburt, and Peter H. Wiebe. Dec 79, 30p Rept nos. WHOI-79-94, WHOI-CONTRIB-4018
Contracts N00014-66-C-0241, N00014-74-C-0262

Pub. in Jnl. of Experimental Marine Biology and Ecology, v39 p101-124 1979. Sponsored in part by Grant NSF-DES74-02783.

No abstract available.

DOE/EV/00936-4 PC **A02/MF A01**
Skidaway Inst. of Oceanography, Savannah, GA.
Biological Processes in the Water Column of the South Atlantic Bight. Annual Progress Report, 1979.
G. A. Paffenhoefer, and J. A. Yoder. 31 Jan 80, 17p
Contract AS09-76EV00936

A study of Summer Intrusions, consisting of 7 weekly cruises between 28 exp 0 50' and 31 exp 0 00'N, was conducted from July 5 to August 17, 1979. Additional chlorophyll and nutrient samples were collected in the study area during the week of August 23. Our goal was to follow a newly intruded water mass for several seeks to determine rates and magnitudes of phyto- and zooplankton for development. (ERA citation 05:016629)

PB80-174238 PC **A04/MF A01**
Johns Hopkins Univ., Baltimore, MD. Chesapeake Bay Inst.
A Reevaluation of the Occurrence of Subpopulations of Striped Bass 'Morone saxatilis', Walbaum in the Upper Chesapeake Bay.
Special rept.,
Bruce D. Sidell, Robert G. Otto, Dennis A. Powers, Michael Karweit, and Joanne Smith. Sep 78, 52p CBI/SR-67, REF-78-7
Sponsored in part by Maryland Dept. of Natural Resources, Annapolis. Power Plant Siting Program.

The possible existence of genetically distinct populations of spawning bass (Morone saxatilis) in the river systems of the upper Chesapeake Bay was investigated by a biochemical genetic approach. Samples of blood and liver from adult fish were obtained during the 1976 spawning runs from the Rappahannock (Virginia), Potomac, Choptank, Sassafras, Bohemia, and Elk rivers (Maryland), and Maryland waters of the Chesapeake and Delaware Canal. Samples were analyzed for frequency of occurrence of a polymorphic liver enzyme, glycerol-3-phosphate dehydrogenase, and variable serum proteins which were not correlated with age or sex. Multivariate and Bayesian analyses of these data indicate apparent genetic homogeneity of spawning bass within the upper Chesapeake Bay. If natal stream homing occurs, a sufficient number of wanderers may provide significant gene flow among river systems. The results suggest that long-term management of the fishery need not be totally on the basis of separate river units.

PB80-177082 PC **A05/MF A01**
Washington Univ., Seattle. Div. of Marine Resources.
Early Life History of Marine Fish: The Egg Stage,
Gotthilf Hempel. 1979, 84p ISBN-0-295-95672-0, NOAA-79103105

Originating from a series of lectures given at the College of Fisheries, University of Washington, in March/April 1975, this volume gives a brief general description of development and objectives of the study of the early life history of fish and continues with the development of the egg cells and with variations in fecundity and egg size in marine fish. The incubation period of demersal and pelagic eggs is considered mainly in relation to ecological aspects. A similar publication on the larval stage is planned.

PB80-178726 Not available NTIS
California Univ., Bodega Bay. Bodega Marine Lab.
Predation by the Nemertean 'Carcinonemertes errans' on Eggs of the Dungeness Crab 'Cancer magister',
D. E. Wickham. c1979, 10p NOAA-80031401
Grants NOAA-158-44121-R/A-19, NOAA-M01-189-R/F-52
Pub. in Marine Biology, v55 p45-53 1979.

The nemertean Carcinonemertes errans is an important predator on the eggs of its host, the Dungeness crab Cancer magister. Each nemertean consumes an average of approximately 70 crab

eggs during the host brooding period. The nemerteans, which apparently consume no other food during the host brooding period, convert crab egg tissue to worm tissue with an efficiency of 28.9% on a caloric basis. Epidemic levels of Carcinonemertes errans on the central California Dungeness crab population have resulted in the direct mortality of an average of 55% of the eggs produced by that population over the last 5 years, making C. errans probably the most numerically significant predator on these crabs. (Copyright (c) by Springer-Verlag 1979.)

PB80-178965 PC A10/MF A01
Point Reyes Bird Observatory, Stinson Beach, CA.
Beached Marine Birds and Mammals of the North American West Coast: A Manual for Their Census and Identification,
David G. Ainley, Gary W. Page, Lisa T. Jones, Lynne E. Stenzel, and Ronald L. LeValley. Jan 80, 217p FWS/OBS-80/03
Contract DI-14-16-001-77027

Much can be learned about the natural history of marine birds and mammals through the systematic study of beach-cast specimens. This manual was prepared to assist the first step, that is, the correct identification of carcasses. Identification keys are supplemented by illustrations, glossaries and narrative accounts of species. Instructions are included for the conduct of beach surveys. This manual includes most species of marine birds and mammals that occur from the Bering Strait, Alaska and along the North American coast south to Cabo San Lucas at the southern tip of Baja California, Mexico.

PB80-180136 PC A02
North Carolina State Univ. at Raleigh. Sea Grant Coll. Program.
The Use of Dredge Islands by Wading Birds,
James F. Parnell, and Robert F. Soots, Jr. c1978, 8p UNC-SG-R-142, NOAA-80032810
Pub. in Wading Birds, Research Report No. 7, National Audubon Society, p105-111 1978.

The dredging of channels through the estuaries of the Atlantic and Gulf coasts is a major engineering effort, resulting in the creation of many man-made islands. Such dredge islands support a variety of bird-life and are especially important as nesting sites for colonial seabirds and wading birds. There are several possibilities for managing dredge islands for the benefit of waders. Most important is to prevent further dredged material from being deposited on active colony sites. Second, the location of all nesting colonies and potential sites should be made known to agencies working in the estuaries. Third, it may be possible to create new islands for use as nesting sites for wading birds. Such effort will, however, require close cooperation with the U.S. Army Corps of Engineers and the other agencies responsible for estuarine life.

PB80-180391 PC A05/MF A01
National Oceanic and Atmospheric Administration, Rockville, MD. Office of Sea Grant.
National Sea Grant College Program--The First Ten Years,
E. W. Seabrook Hull. Mar 79, 92p NOAA-80012301

A descriptive account is given of the first ten years of the National Sea Grant Program. Summaries of completed, ongoing, and planned projects are presented. Areas of activities are identified as: marine resource development, socioeconomic and legal research, marine technology research and development, marine environmental research, marine education and training, advisory services, and program management and development.

PB80-180425 PC A04/MF A01
Washington Univ., Seattle. Dept. of Oceanography.
Environmental Investigation of the Effects of Deep-Sea Mining on the Phytoplankton in the Tropical Eastern Pacific Ocean, with Special Attention on Primary Productivity.
Special rept.,
A. T. Chan, E. Ozturgut, R. Jacobson, and G. C. Anderson. Jan 80, 57p SR-92, REF-M80-2, NOAA-80040801
Contract NOAA-03-6-022-35101

Experiments were performed during two cruises of the R.V. Oceanographer in November 1978 and March 1979 to assess the potential effects of the mining of manganese nodules on the local phytoplankton photosynthesis and primary production in the tropical eastern Pacific Ocean. The short-term (on the order of a few hours) reduction in primary production due to the light attenuation effects caused by the mining discharge was estimated at approximately 40%. Stimulation or inhibition of photosynthesis by the mining discharge was not observed. The long-term effect of the mining activity on the phytoplankton community and on primary production is discussed.

PB80-181068 PC A04/MF A01
National Marine Fisheries Service, Miami, FL. Southeast Fisheries Center.
Comparison of Ecological and Life History Information on Goblid Fishes, with Emphasis on the Southeastern United States.
Technical memo.,
George H. Darcy. Mar 80, 56p NOAA-TM-NMFS-SEFC-15, NOAA-80041104

Fishes of the family Gobiidae are numerous and diverse, although they share certain similarities in their life histories. This paper compares several of these aspects: temperature and salinity tolerance ranges, food habits, sizes and ages at maturation, maximum sizes, maximum ages, spawning seasons, number of spawnings, intervals between spawning, fecundities, egg sizes, incubation periods, lengths of newly-hatched larvae, times until metamorphosis, and lengths of larvae at metamorphosis. Gobiids are important as aquarium fishes and are used to some extent as food and bait, though their major importance is probably their role in nearshore and pelagic food chains.

PB80-181506 PC A16/MF A01
Texas Univ. at Austin, Port Aransas. Port Aransas Marine Lab.
Environmental Studies, South Texas Outer Continental Shelf, 1975-1977. Volume I. Ecosystem Description,
R. Warren Flint, and Nancy N. Rabalais. Jan 80, 358p BLM/YM/ES-80/4
Contract DI-AA551-CT8-51
See also Volume 2, PB80-181514.
Also available in set of 3 reports PC E19, PB80-181498.

This study of the South Texas Outer Continental Shelf (STOCS) was conducted on behalf of the Bureau of Land Management and with the close cooperation of personnel of that agency. The results reported on herein constituted a synthesis of three years of an environmental studies program of the STOCS. This study was part of an overall program that included the other elements of (1) geology and geophysics by the U.S. Geological Survey, (2) fisheries resources and ichthyoplankton populations by the National Oceanic and Atmospheric Administration/National Marine Fisheries Service, and (3) biological and chemical characteristics of selected topographic features in the northern Gulf of Mexico by Texas A and M University.

PB80-181514 PC A15/MF A01
Texas Univ. at Austin, Port Aransas. Port Aransas Marine Lab.
Environmental Studies, South Texas Outer Continental Shelf, 1975-1977. Volume II. Data Management,
Raymond A. Benavides, R. Warren Flint, and Robert Godbout. Jan 80, 343p BLM/YM/ES-80/5
Contract DI-AA551-CT8-51
See also Volume 1, PB80-181506, and Volume 3, PB80-181522.
Also available in set of 3 reports PC E19, PB80-181498.

This study of the South Texas Outer Continental Shelf (STOCS) was conducted on behalf of the Bureau of Land Management and with the close cooperation of personnel of that agency. The results reported on herein constituted a synthesis of three years of an environmental studies program of the STOCS. This study was part of an overall program that included the other elements of (1) geology and geophysics by the U.S. Geological Survey, (2) fisheries resources and ichthyoplankton populations by the National Oceanic and Atmospheric Administration/National Marine Fisheries Service, and (3) biological and chemical characteristics of selected topographic features in the northern Gulf of Mexico by Texas A and M University.

PB80-181548 PC A02/MF A01
Science Applications, Inc., Raleigh, NC.
South Atlantic OCS Physical Oceanography. Volume I.
Final rept.
Mar 80, 17p BLM/YM/ES-80/1
Contract DI-AA550-CT7-29
See also Volume 2, PB80-181555.
Also available in set of 3 reports PC E19, PB80-181530.

This final progress report represents the results of the first year of a four year physical oceanographic and meteorological data collection effort on the Outer Continental Shelf (OCS) from Cape Hatteras, North Carolina to Cape Canaveral, Florida, during the period of September 1977 through November 1978. The report is to be used to provide an understanding of the currents, circulation and mixing processes in the Georgia Embayment/South Atlantic Bight (SAB) to assess the effects of OCS oil and gas activities on the biological environment, as well as on recreational and commercial fishing. This program will eventually lead to analytical and numerical estimation (modeling) of the SAB physical oceanography.

PB80-182231 (Order as PB80-182223, PC A03/MF A01)
National Marine Fisheries Service, Seattle, WA. Northwest and Alaska Fisheries Center.
Interactions of Marine Mammals and Pacific Hake,
Clifford H. Fiscus. Oct 79, 10p NOAA-80032701-1
Included in Marine Fisheries Review, v41 n10 p1-9 Oct 79.

The biology, feeding habits, seasonal distribution, and range of the Pacific hake, Merluccius productus, are briefly described. The commercial hake fishery is also discussed. Marine mammals inhabiting the range of the Pacific hake are listed and population estimates are given when known. The known or suspected marine mammal predators on hake are described in detail. The range and seasonal distribution of each species is given and principal prey species (including hake) are discussed. A partial listing of fish which prey on hake is given.

PB80-182249 (Order as PB80-182223, PC A03/MF A01)
National Marine Fisheries Service, Highlands, NJ. Sandy Hook Lab.
Management for Increasing Clam Abundance,
Clyde L. MacKensie, Jr. Oct 79, 14p NOAA-80032701-2
Included in Marine Fisheries Review, v41 n10 p10-22 Oct 79.

An urgent need exists to increase clam abundance in beds of the eastern United States in order to improve the economic status of clam fishermen and local communities as well as to increase clam supplies at stable market prices. Heretofore, clam fishermen have depended entirely on the vagaries of environmental factors to provide clams in beds, all of which are wild. The hard clam and soft clam each have a sufficiently large biotic potential to stock beds with clam populations of maximum abundance, but environmental factors suppress it, keeping clams in low abundance. In this paper, a strategy and tactics are suggested for increasing clam abundance by at least severalfold through improving environments of setting clam larvae, clam spat, and juveniles.

PB80-182348 PC A02
North Carolina Univ. at Chapel Hill.
Phytoplankton Population Dynamics and Productivity in a Sewage-Enriched Tidal Creek in North Carolina,
James G. Sanders, and Edward J. Kuenzler. c1979, 12p UNC-SG-R-139, NOAA-80032820
Pub. in Estuaries, v2 n2 p87-96 Jun 79.

Calico Creek differs from neighboring estuaries in that it receives sewage effluent, and its waters therefore contain ample nutrients. High nutrient levels enable the phytoplankton population, which is probably light-limited, to reach densities of 10 to the 9th power cells ./1 during the summer, 2 to 3 orders of magnitude higher than the surrounding nutrient-limited populations. At cell densities greater than 10 to the 8th power cells ./1 the number of dominant species is greatly reduced, and the level of diversity drops sharply. Calico Creek also differs by being very shallow; the population can be drastically affected by high runoff. The productivity of both the phytoplankton and the surrounding Spartina marsh is much higher than the neighboring unpolluted estuaries. Unlike the larger and more stable estuaries nearby, the dependence of the population on the effluent for nutrients, the possibility of toxic materials entering the creek with the effluent, and its small size make Calico Creek subject to sudden change. (Copyright (c) 1979 Estuarine Research Federation.)

PB80-182991 PC **A04**/MF **A01**
Alaska Univ., Fairbanks. Inst. of Marine Science.
A Preliminary Survey of the Benthos of Resurrection Bay and Aialik, Alaska,
Howard M. Feder, A. J. Paul, and J. McDonald. Dec 79, 57p IMS-R78-7, SG-79-9, NOAA-80032002
Contract NOAA-03-5-022-56, Grant NOAA-04-8-M01-187

A compilation of biological data collected in two adjacent south central Alaskan Bays, Resurrection Bay and Aialik Bay aboard the R/V Acona in November 1977 and April 1978 is presented. The primary purpose of these cruises was to capture the snow crab, (Chionoecetes bairdi), for Outer Continental Shelf Environmental Assessment Program (OCSEAP) studies. Information on distribution, abundance, and biology of other invertebrates and some fishes is presented in this report for the future reference of biologists working at the Seward Marine Laboratory situated at the head of Resurrection Bay.

PB80-183072 PC **A03**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Food of Fifteen Northwest Atlantic Gadiform Fishes,
Richard W. Langton, and Ray E. Bowman. Feb 80, 32p NOAA-TR-NMFS-SSRF-740, NOAA-80032901

The food of 15 species of gadiform fishes occurring in the northwest Atlantic, from Cape Hatteras, N.C., to Nova Scotia, have been investigated for the years 1969-72.

PB80-183577 PC **A02**/MF **A01**
National Marine Fisheries Service, Panama City, FL. Panama City Lab.
A Summarization and Discussion of Age and Growth of Spot, 'Leiostomus xanthurus' Lacepede, Sand Seatrout, 'Cynoscion arenarius' Ginsburg, and Silver Seatrout, 'Cynoscion nothus' (Holbrook), Based on a Literature Review,
Lyman E. Barger, and Mark L. Williams. Mar 80, 18p NOAA-TM-NMFS-SEFC-14, NOAA-80042112

The literature dealing with age and growth of spot (Leiostomus xanthurus), sand seatrout (Cynoscion arenarius) and silver seatrout (C. nothus) was reviewed. Length-frequency analysis was the most frequently used technique for aging the three species; however, size overlap renders the technique progressively unsuitable as the fish grow older. Otolith and scale analysis, both of which have been verified as usable for aging spot, yielded reported ages of up to 3 and 4.5 years respectively. A mathematical summary of age and growth information was developed using least-squares regression analysis. Length-frequency analysis was the only successful method reported for ageing the two seatrouts. Up to three age classes have been identified for sand seatrout. The life span for silver seatrout has been estimated as being little more than one year.

PB80-183676 PC **A02**
Hawaii Inst. of Marine Biology, Honolulu.
Loggerhead Turtle Recovered from a Tiger Shark at Kure Atoll,
George H. Balazs. Jun 79, 4p UNIHI-SG-JC-79-03, NOAA-80041404
Pub. in Elepaio, Jnl. of the Hawaii Audubon Society, v39 n12 p145-147 Jun 79.

During a visit to Green Island at Kure Atoll in the Northwestern Hawaiian Islands on 26 July 1978, partially digested parts of a sea turtle were recovered from the stomach of a large tiger shark (Galeocerdo cuvier). The turtle parts consisted of an intact mandible, the horny beaks that cover the jaws, and small portions of the cranium, plastron, and carapace. Examination of these items and comparisons with data presented by Carr (1952) and the loggerheads at Sea Life Park resulted in the positive identification of the turtle as a loggerhead. Based on the size of the mandible, the straight carapace length was estimated to have been 55-60 cm, indicative of an immature specimen. Tiger sharks are known to feed regularly on sea turtles, a fact that has been well documented for Hawaiian green turtles (Chelona mydas) throughout much of the Archipelago. The recovery and analysis of turtle parts, such as reported in the present case, therefore offer considerable potential for gathering valuable ecological data on sea turtles that would be difficult, if not impossible, to obtain by other sampling techniques.

PB80-185226 PC **A03**
South Carolina Wildlife and Marine Resources Dept., Charleston. Marine Resources Center.
Lipid Composition of Marine and Estuarine Invertebrates: Porifera and Cnidaria,
Jeanne D. Joseph. c1979, 32p NOAA-80040901
Grant NOAA-04-7-158-44085
Pub. in Prog. Lipid Res., v18 p1-30 1979.

It is evident, although based upon somewhat limited data, that the Porifera and the Cnidaria differ substantially in their lipid composition and metabolism. Only one class of sponges, the Demospongiae, has been studied, but the lipids of these sponges are, primarily, those typically found in cellular membranes of more advanced phyla, while energy-producing lipids are abundant in cnidarians. In particular, wax esters are prominent lipids in many corals and anemones, but may be limited to the female gonad of the latter. Phosphonolipids, with their stable carbon-phosphorus bond may have a specialized function in cnidarian membranes. Plasmalogens appear to be common in both sponges and cnidarians. Long-chained fatty acids having delta 5,9 unsaturation are characteristic of the Demospongiae and probably confer special properties or functions upon the sponge membranes. The acids of sponges are relatively less unsaturated than those of cnidarians and chain-elongation and desaturation appear to be restricted to those acids of low initial unsaturation. Cnidarian fatty acids are highly unsaturated, except for those of tropical hydrozoan soft corals.

PB80-186067 PC **A03**/MF **A01**
Alaska Univ., Fairbanks. Inst. of Marine Science.
A Literature Search: Relationship between the Distribution of Pink Shrimp, 'Pandalus borealis' and Oceanographic Parameters,
A. Ippolito, H. J. Niebauer, T. Nishiyama, and T. Weingartner. Feb 80, 35p ASGR-79-11, NOAA-80042202
Grant NOAA-04-8-M01-187

Pandalid shrimp have provided a valuable commercial fishery in the northeastern Pacific Ocean, including Alaska, since the late 1800s. The bulk of commercial shrimp landings in Alaskan waters consists of pink shrimp, Pandalus borealis. This bibliography contains references to the physical, biological and fisheries oceanography, marine biology and marine meteorology of the Pacific northeast and Gulf of Alaska in which the pink shrimp population is found.

8C. Dynamic Oceanography

AD-A083 239/4 MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
Energy Spectra in Shallow U. S. Coastal Waters.
Technical paper,
Edward F. Thompson. Feb 80, 154p Rept no. CERC-TP-80-2
Availability: Microfiche copies only.

Digital wave analyses for 3 to 12 months of data from each of 11 U.S. coastal gages are summarized and discussed. Water depths at the gage sites were typically between 5 and 9 meters. The gage designs included step resistance, continuous wire, pressure, and accelerometer buoy. The analysis for each record included computation of the energy (or variance) spectrum and the distribution function of sea-surface elevations. Parameters of the spectrum and distribution function of sea-surface elevations were also computed. Spectra and parameters for the 24 highest energy cases from each gage location are presented individually. Spectra for all cases are grouped according to significant wave height and peak spectral period. Mean spectra and standard deviations about the mean are presented for most height-period groups. Parameters for all cases are summarized, including number of major spectral peaks, spectral-peakedness parameter, and third and fourth moments of the normalized distribution function of sea-surface elevations.

AD-A083 281/6 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution MA
A Compilation of Moored Current Meter Data and Associated Oceanographic Observations. Volume XXII. (1973 Observations).
Technical rept.,
Susan Tarbell, and Richard Payne. Dec 79, 34p Rept no. WHOI-79-87
Contract N00014-76-C-0197
See also Volume 28, AD-A073 581.

Current and temperature measurements from instruments on moorings set in 1973 at Site D and the Muir Seamount are presented. Both horizontal and vertical arrays are presented using low-passed filtered data. The basic time series from individual current meters are displayed with statistical tables, spectral diagrams, progressive vector plots, and plots of variables versus time. (Author)

AD-A083 319/4 PC **A05**/MF **A01**
Woods Hole Oceanographic Institution MA
The Deep Western Boundary Current at the Blake-Bahama Outer Ridge: Current Meter and Temperature Observations, 1977-1978.
Technical rept.,
Carol A. Mills, and Peter Rhines. Dec 79, 92p Rept no. WHOI-79-85
Contract N00014-76-C-0197, Grant NSF-OCE76-81190

We describe the current-meter data collected from 4 moorings (11 current meters) in the vicinity of the Blake-Bahama Outer Ridge. These 12-month records document both mean eddy activity of the deep western boundary current of the North Atlantic, near 30 N. In addition, the temperature records show large-scale, westward propagating eddies in which the ocean above the thermocline actively affects the abyssal jet. (Author)

AD-A083 426/7 PC **A03**/MF **A01**
Johns Hopkins Univ Laurel MD Applied Physics Lab
Proposed Model for the Elevation Spectrum of a Wind-Roughened Sea Surface.
Technical memo.,
A. W. Bjerkaas, and F. W. Riedel. Dec 79, 32p Rept no. JHU/APL/TG-1328
Contract N00024-78-C-5384

A new model for the elevation spectrum of wind-generated ocean waves has been developed. The proposed model is a modification of the Pierson model spectrum. An error in the Pierson model has been corrected, the lower bound of the Mitsuyasu-Honda spectral range has been increased, and the Leykin-Rosenberg spectral range has been eliminated. The result of these modifications is a simpler model that still compares favorably with existing data. (Author)

N80-21406/7 PC **A05**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronic and Space Systems.
Coastal Oceans Monitoring Satellite System (COMSS). Volume 1: Executive Summary.
Final Report.

Mar 79, 81p ESS/SS-930, ESA-CR(P)-1281
Contract ESA-3632/78-F-CG
Prepared in Cooperation with Engins Matra Velizy, France; Technical Univ. Of Denmark, Copenhagen; Logica LTD. And Sira Inst. Ltd. Original Contains Color Illustrations.

A study of the major systems aspects associated with the Coastal Ocean Monitoring Satellite System (COMSS) and design studies of principal payload elements in the space segment are presented. The COMSS concept envisages a large 3-axis stabilized satellite incorporating several Earth observation sensors operating in the visible, infrared, and microwave regions of the spectrum. This satellite and the system of which it forms a part would be used for monitoring the economically and environmentally important coastal oceans regions of Europe and the World.

PB80-181555 PC **A15/MF A01**
Science Applications, Inc., Raleigh, NC.
South Atlantic OCS Physical Oceanography. Volume II.
Final rept.
Mar 80, 348p BLM/YM/ES-80/2
Contract DI-AA550-CT7-29
See also Volume 1, PB80-181548, and Volume 3, PB80-181563.
Also available in set of 3 reports PC E19, PB80-181530.

This final progress report represents the results of the first year of a four year physical oceanographic and meteorological data collection effort on the Outer Continental Shelf (OCS) from Cape Hatteras, North Carolina to Cape Canaveral, Florida, during the period of September 1977 through November 1978. The report is to be used to provide an understanding of the currents, circulation and mixing processes in the Georgia Embayment/South Atlantic Bight (SAB) to assess the effects of OCS oil and gas activities on the biological environment, as well as on recreational and commercial fishing.

8E. Geodesy

AD-A083 193/3 PC **A03/MF A01**
Stanford Univ CA Dept of Computer Science
Large Scale Geodetic Least Squares Adjustment by Dissection and Orthogonal Decomposition.
Technical rept.,
Gene H. Golub, and Robert J. Plemmons. Nov 79, 36p Rept no. STAN-CS-79-774
Grants DAAG29-77-G-0179, DAAG29-77-G-0166
Prepared in cooperation with Tennessee Univ., Knoxville. Sponsored in part by Grant NSF-MCS78-11985.

Very large scale matrix problems currently arise in the contex of accurately computing the coordinates of points on the surface of the earth. Here geodesists adjust the approximate values of these coordinates by computing least squares solutions to large sparse systems of equations which result from relating the coordinates to certain observations such as distances or angles between points. The purpose of this paper is to suggest an alternative to the formation and solution of the normal equations for these least squares adjustment problems. In particular, it is shown how a block-orthogonal decomposition method can be used in conjunction with a nested dissection scheme to produce an algorithm for solving such problems which combines efficient data management with numerical stability. As an indication of the magnitude that these least squares adjustment problems can sometimes attain, the forthcoming readjustment of the North American Datum in 1983 by the National Geodetic Survey is discussed. Here it becomes necessary to linearize and solve an overdetermined system of approximately 6,000,000 equations in 400,000 unknowns - a truly large-scale matrix problem. (Author)

N80-21823/3 PC **A08/MF A01**
Ohio State Univ., Columbus. Dept. of Geodetic Science.
Spectral Analysis of GEOS-3 Altimeter Data and Frequency Domain Collocation.
K. Eren. Feb 80, 158p NASA-CR-162630, REPT-297
Grant NSG-5275

The mathematical background in spectral analysis as applied to geodetic applications is summarized. The resolution (cut-off frequency) of the GEOS 3 altimeter data is examined by determining the shortest wavelength (corresponding to the cut-off frequency) recoverable. The data from some 18 profiles are used. The total power (variance) in the sea surface topography with respect to the reference ellipsoid as well as with respect to the GEM-9 surface is computed. A fast inversion algorithm for matrices of simple and block Toeplitz matrices and its application to least squares collocation is explained. This algorithm yields a considerable gain in computer time and storage in comparison with conventional least squares collocation. Frequency domain least squares collocation techniques are also introduced and applied to estimating gravity anomalies from GEOS 3 altimeter data. These techniques substantially reduce the computer time and requirements in storage associated with the conventional least squares collocation. Numerical examples given demonstrate the efficiency and speed of these techniques.

8F. Geography

N80-21822/5 PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Findings of the OPIT Study in America.
A. Couzy. Mar 80, 18p NASA-TM-76106, REPT-79/1564-29
Contract NASW-3199
Transl. Into English of "Mission d'Etude en Amerique," Rept-79/1564-29, Paris, Mar. - Apr. 1979 p 1-19. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Centre National d'Etudes Spatiales (France).

The results of operational applications of American satellite remote sensing are presented. The application of data from satellites such as LANDSAT in European conditions is evaluated.

N80-21825/8 PC **A04/MF A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
LASS: Land Applications Satellite System. Volume 1: Executive Summary.
Final Report.
Jun 79, 70p ESA-CR(P)-1250
Contract ESA-3633/78-F-CG(SC)
Prepared in Cooperation with Engins Matra and Christian Rovsing.

An overall systems study has been prepared for the Land Applications Satellite System portion of the European Remote Sensing Program. Included are: definition and description of a technically feasible baseline overall system concept, evaluation of a development program best suited to the specific requirements and suppositions, recommendation of a supporting research and technology programme necessary for predevelopment of critical items and technologies, and identification of the growth potential inherent to the system and its assessment versus future advanced missions.

PB80-176233 PC **A06/MF A01**
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
A Land Cover Inventory from Space: Staff Report.
Jun 78, 114p

The project area consisted of 7,362 square miles covering thirteen counties in southwestern Illinois. This area contained a designated regional 208 water quality management planning area; an air quality maintenance planning area; a diversity of point and non-point air and water pollution sources; active and reclaimed strip mines and other mineral extraction sites; and other similar features relevant to environmental protection concerns. The area also contained a sample of urban, rural, and natural features illustrative of the variety of land cover conditions found throughout most of the State.

8G. Geology and Mineralogy

AD-A083 162/8 PC **A02/MF A01**
Woods Hole Oceanographic Institution MA
Modeling the Oceanic Magnetic Source Layer,
Hans Schouten, and Charles R. Denham. 1979, 15p Rept nos. WHOI-79-77, WHOI-CONTRIB-4233
Contract N00014-74-C-0262
Pub. in Deep Drilling Results in the Atlantic Ocean: Ocean Crust (Ewing Symposium Series), v2 p151-159 Oct 79.

No abstract available.

AD-A083 139/3 PC **A02/MF A01**
Woods Hole Oceanographic Institution MA
On the Likelihood of Mixed Polarity in Oceanic Basement Drill Cores.
Technical rept.,
Charles R. Denham, and Hans Schouten. 1979, 12p Rept nos. WHOI-79-78, WHOI-CONTRIB-4279
Contract N00014-74-C-0262
Pub. in Deep Drilling Results in the Atlantic Ocean: Ocean Crust (Ewing Symposium Series), v2 p160-165 Nov 79.

No abstract available.

AD-A083 401/0 PC **A02/MF A01**
Woods Hole Oceanographic Institution MA Dept of Geology and Geophysics
Tectonics of the Western Gulf of Oman.
Technical rept.,
Robert S. White, and David A. Ross. 26 Jul 78, 16p Rept nos. WHOI-79-98, WHOI-CONTRIB-4196
Contract N00014-74-C-0262, Grant NSF-OCE76-10417
Prepared in cooperation with Cambridge Univ. (England). Dept. of Geodesy and Geophysics. Pub. in Jnl. of Geophysical Research, v84 nB7, p3479-3489, 10 Jul 79.

No abstract available.

AD-A083 429/1 PC **A03/MF A01**
Woods Hole Oceanographic Institution MA
Geological and Geophysical Investigation of the Midcayman Rise Spreading Center: Initial Results and Observations.
Technical rept.,
Robert Ballard, Wilfred Bryan, Henry Dick, K. O. Emery, and Geoffrey Thompson. 1979, 33p Rept nos. WHOI-79-99, WHOI-CONTRIB-4278
Contracts N00014-74-C-0262, NSR-09-51-001
Pub. in AGU Ewing Symposium Series, v2 p66-93 1979. Sponsored in part by Grants NSF-OCE75-18533 and NSF-OCE76-21882.

No abstract available.

AD-A083 479/6 PC **A07/MF A01**
Foreign Technology Div Wright-Patterson AFB OH
Geology of the USSR (Chapter IV).
5 Oct 79, 140p Rept no. FTD-ID(RS)T-1266-79
Unedited machine trans. of Geologiya SSSR (USSR) v26 p60-108 1970.

No abstract available.

AD-A083 602/3 PC **A02/MF A01**
Lamont-Doherty Geological Observatory Palisades NY
Changes in the Crust and Upper Mantle Near the Japan-Bonin Trench.
Journal article,
R. Houtz, C. Windisch, and S. Murauchi. 1979, 10p Rept no. LDGO-2922
Contract N00014-75-C-0210
Pub. in Jnl. of Geophysical Research, v85 nB1 p267-274, 10 Jan 80.

No abstract available.

AD-A083 603/1 PC **A03/MF A01**
Lamont-Doherty Geological Observatory Palisades NY
Seismic Stratigraphy, Lithostratigraphy and Paleosedimentation Patterns in the North American Basin,
Brian E. Tucholke, and Gregory S. Mountain. 1979, 31p Rept no. LDGO-2756
Contracts N00014-67-A-0108-0004, N00014-75-C-0210
Pub. in Deep Drilling Results in the Atlantic Ocean: Continental Margins and Paleo-environment, p58-

86, n.d. Prepared in cooperation with Columbia Univ., New York. Dept. of Geological Sciences. Sponsored in part by Grants NSF-GA-550, NSF-GA-27281, NSF-DES71-00214, NSF-OCE76-82326 and NSF-OCE76-02038.

No abstract available.

AD-A083 604/9 PC A02/MF A01
Lamont-Doherty Geological Observatory Palisades NY
Observations of Flexure and the Geological Evolution of the Pacific Ocean Basin.
Journal article,
A. B. Watts, J. H. Bodine, and N. M. Ribe. 3 Aug 79, 7p Rept no. LDGO-2928
Contract N00014-75-C-0210, Grant NSF-OCE77-07941
Pub. in Nature, v283 n5747 p532-537, 7 Feb 80. Prepared in cooperation with Chicago Univ., IL. Dept. of Geophysical Sciences.

No abstract available.

AD-A083 605/6 PC A02/MF A01
Lamont-Doherty Geological Observatory Palisades NY
Tectonic and Igneous Emplacement of Crust in Oceanic Transform Zones.
Book article,
Enrico Bonatti, Andy Chermak, and Jose Honnorez. 1979, 12p Rept no. LDGO-2785
Contract N00014-75-C-0210, Grant NSF-OCE76-01755
Pub. in Deep Drilling Results in the Atlantic Ocean: Ocean Crust, p239-248 1979. Prepared in cooperation with Rosenstiel School of Marine and Atmospheric Science, Miami, FL.

No abstract available.

COO-3134-20 PC A06/MF A01
Lamont-Doherty Geological Observatory, Palisades, NY.
Comprehensive Study of the Seismotectonics of the Eastern Aleutian Arc and Associated Volcanic Systems. Annual Progress Report, March 1, 1979-February 29, 1980.
K. H. Jacob, J. N. Davies, and L. R. Sykes. 1979, 111p
Contract EY-76-S-02-3134

The modern and historic seismicity of the eastern Aleutian arc was thoroughly researched and shows clear evidence that the Shumagin Islands region of the arc has been ruptured at least partly by previous large or great earthquakes; has recurrence times for large earthquakes between 50 and 115 years; has presently the properties of a seismic gap, i.e., was not ruptured by a large or great earthquake for at least 76 years; shows a donut configuration of modest seismicity including high-stress-drop events around the rim of the expected rupture zone of a future large earthquake. From this combined evidence it is concluded that the likelihood for a large or great earthquake to occur within the Shumagin Island gap is high (about 50% probability) within the next decade and very high (about 80% to 90% probability) within the next three decades. This study includes detailed determinations of stress, stress-drop, and other source parameters of moderate earthquakes in the Shumagin islands gap, and similar results for the St. Elias earthquake near the Yakataga gap in the eastern Gulf of Alaska. Volcano seismicity, crustal deformantion, and P-residuals continue to be monitored and analyzed in the eastern Aleutian arc segment. 36 figures, 3 tables. (ERA citation 05:012694)

DOE/ET/28392-29 PC A04/MF A01
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab.
Bipole-Dipole Interpretation with Three-Dimensional Models (Including a Field Study of Las Alturas, New Mexico).
G. W. Hohmann, and G. R. Jiracek. Sep 79, 58p
Contract EG-78-C-07-1701

The bipole-dipole responses of three-dimensional (3D) prisms were studied using an integral equation numerical solution. Although response patterns are quite complex, the bipole-dipole method appears to be a useful, efficient means of mapping the areal distribution of resistivity. However, 3D modeling is required for quantitative interpretation. Computer time for our solution varies from negligible for small bodies to 6 minutes on a UNIVAC 1108 for the largest possible body (85 cubes). Bipole-dipole response varies significantly with bipole orientation and position, but simply changing the distance between the bipole and the body does not greatly affect the response. However, the response is complex and interpretation ambiguous if both transmitter electrodes are located directly over a body. Boundaries of shallow bodies are much better resolved than those of deep bodies. Conductive bodies produce false polarization highs that can confuse interpretation. It is difficult to distinguish the effects of depth and resistivity contrast, and, as with all electrical methods, depth extent is difficult to resolve. Interactive interpretation of bipole-dipole field results from a geothermal prospect in New Mexico illustrates the value of the 3D modeling technique. (ERA citation 05:015502)

DOE/TIC-11059 PC A10/MF A01
National Academy of Sciences, Washington, DC.
Geophysical Predictions.
1978, 225p

Individual abstracts were prepared for the 19 papers in this report. (ERA citation 05:016914)

IDO-1601-T1 PC A09/MF A01
Utah Univ., Salt Lake City. Dept. of Geology and Geophysics.
Regional Gravity and Aeromagnetic Surveys of the Mineral Mountains and Vicinity, Millard and Beaver Counties, Utah.
J. A. Carter, and K. L. Cook. Apr 78, 193p
Contract EY-76-S-07-1601

The results of gravity and aeromagnetic surveys of the Mineral Mountains and vicinity are presented as a terrain-corrected Bouguer gravity anomaly map (about 1450 stations with 1-mgal contour interval) and a total magnetic field intensity residual anomaly map (with contour interval 50 gammas), respectively. Combined interpretation of the gravity and aeromagnetic data was conducted based on comparing and contrasting various processed maps and interpretative geologic cross sections produced from each survey. (ERA citation 05:011731)

INIS-mf-5311 PC A02/MF A01
Bureau of Mineral Resources, Geology and Geophysics, Canberra (Australia).
Uranium in Australia 1975-1978, a Bibliography.
1978, 7p
U.S. Sales Only.

The bibliography contains details of Australia's uranium deposits, reserves, and mining and export plans. (Atomindex citation 10:490765)

LBL-9557 PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Validity of Cubic Law for Fluid Flow in a Deformable Rock Fracture. Technical Information Report No. 23.
P. A. Witherspoon, J. S. Y. Wang, K. Iwai, and J. E. Gale. Oct 79, 34p
Contract W-7405-ENG-48

The validity of the cubic law for laminar flow of fluids through open fractures consisting of parallel planar plates has been established by others over a wide range of conditions with apertures ranging down to a minimum of 0.2 mu m. The law may be given in simplified form by Q/ delta h = C(2b) exp 3 , where Q is the flow rate, delta h is the difference in hydraulic head, C is a constant that depends on the flow geometry and fluid properties, and 2b is the fracture aperture. The validity of this law for flow in a closed fracture where the surfaces are in contact and the aperture is being decreased under stress has been investigated at room temperature using homogeneous samples of granite, basalt, and marble. Tension fractures were artifically induced and the laboratory setup used radial as well as straight flow geometries. Apertures ranged from 250 mu m down to 4 mu m. The cubic law was found to be valid whether the fracture surfaces were held open or were being closed under stress, and the results are not dependent on rock type. Permeability was uniquely defined by fracture aperture and was independent of the stress history used in these investigations. The effects of deviations from the ideal parallel plate concept only cause an apparent reduction in flow and may be incorporated into the cubic law by replacing C by C/f. The factor f varied from 1.04 to 1.65 in these investigations. The model of a fracture that is being closed under normal stress is visualized as being controlled by the strength of the asperities that are in contact. These contact areas are able to withstand significant stresses while maintaining space for fluids to continue to flow as the fracture aperture decreases. The controlling factor is the magnitude of the aperture and since flow depends on (2b) exp 3 , a slight change in aperture evidently can easily dominate any other change in the geometry of the flow field. (ERA citation 05:016946)

NTISUB/E/157-013 MF$40.00
Smithsonian Institution, Washington, DC. Scientific Event Alert Network.
SEAN Bulletin, Volume 4, Numbers 1 thru 12.
1979, 347p
Microfiche copy only. Paper copy also available on subscription.

The SEAN Bulletin contains reports and statistical data on the worldwide geophysical, meteoritical, and biological science events that were gathered and verified by the Scientific Event Alert Network during the period January 1, 1979 thru December 31, 1979.

ORNL/TM-7052 PC A04/MF A01
Oak Ridge National Lab., TN.
Thermal Conductivity of the Rocks in the Bureau of Mines Standard Rock Suite.
M. T. Morgan, and G. A. West. Jan 80, 60p
Contract W-7405-ENG-26

Thermal conductivities of eight rocks from the Bureau of Mines Standard Rock Suite were measured in air over the temperature range 373 to 533 exp 0 K (100 to 260 exp 0 C). The thermal conductivities of these rocks were measured to furnish standards for future comparisons with host rock from prospective nuclear waste repository sites. The thermal conductivity at a given temperature decreased by as much as 9% after a specimen had been heated to the maximum temperature (533 exp 0 K), but additional heating cycles had no further effect. This decrease was smallest in the igneous rocks and largest in the sedimentary types. Variations due to orientation were within the precision of measurements (+- 5%). In most cases the thermal conductivities were linear with the reciprocal of the temperature and were within 14% of published data obtained by other methods. Measurements were made by a cut-bar comparison method in which the sample was sandwiched between two reference or metering bars made of Pyroceram 9606 glass-ceramic. The apparatus consisted of a Dynatech Model TCFCM-N20 comparative thermal conductivity analyzer controlled by a Hewlett Packard Model 3052A data acquisition system. A program was written to increment and cycle the temperature in steps between predetermined initial and maximum values. At each step the thermal conductivity was measured after steady-state conditions were established. The rocks furnished by the Bureau of Mines were quarried in large and fairly homogeneous lots for use by researchers at various laboratories. To investigate any anisotropy, cores were taken from each rock cube perpendicular to each of the cube faces. Samples 2 in. in diameter and approx. 0.75 in. thick were prepared from the cores and were dried in a vacuum oven for at least one month prior to taking measurements. (ERA citation 05:012697)

PB80-180128 PC A02
North Carolina Univ. at Wilmington. Dept. of Biology.
Cyclic Geomorphic Patterns of Washover on a Barrier Island in Southeastern North Carolina.
Paul E. Hosier, and William J. Cleary. c1977, 10p
UNC-SG-R-146, NOAA-80032814
Pub. in Environmental Geology, v2 p23-31 1977.

A detailed analysis of historic aerial photographs provided the data for determining the magnitude and importance of oceanic overwash on Masonboro Island, southeastern North Carolina. Overwash, which is both temporally and spatially distributed, produces a suite of physiographic features on the subaerial portion of the island. Four

physiographic types are recognized including: (a) small coalescing loosely vegetated dunes, (b) intact, well-vegetated dunes and terraces, (c) individual, isolated washover fans, and (d) washover terraces. Vegetation patterns, including shrub thickets and black needle rush marshes are related to old fan sites. Sites dominated by saltmeadow cordgrass and goldenrod are associated with recent overwashes. A process-response model, which synthesizes the physiographic types and vegetation patterns, provides input for a management program for the island. Five sections on Masonboro Island are delineated on the basis of washover history and potential for future washovers. The response of Masonboro Island to overwash is similar to that observed on Core Banks, NC; however there are several differences, probably because of the rapidity with which dune ridges redevelop after washovers. (Copyright (c) 1977 by Springer-Verlag New York Inc.)

PB80-180169 PC A02
North Carolina State Univ. at Raleigh. Sea Grant Coll. Program.
Genesis and Significance of Marsh Islands within Southeastern North Carolina Lagoons,
William J. Cleary, Paul E. Hoiser, and Glenn R. Wells. c1979, 8p UNC-SG-R-150, NOAA-80032807
Grant NOAA-04-6-158-44054
Pub. in Jnl. of Sedimentary Petrology, v49 n3 p703-710 Sep 79.

Fifty-four islands of low relief, varying from 36 m to 1512 m long are present within the narrow, marsh-filled lagoons behind the barrier islands between New River Inlet and Carolina Beach Inlet in Southeastern North Carolina. Information derived from inspection of aerial photographs, historic maps and charts, and field data, indicate that these islands form where sands overtop marshes forming a narrow berm. These features likely form during periods of increased wave swash. The occurrence of these geomorphic features can be used to indicate the migration of a single inlet or several inlets along a zone prone to inlet formation. The islands consistently present a stratigraphic sequence where fine-grained, humic-stained, carbonate-free sands overlie muddy peat. Landward of these islands, organic-rich peat sequences are commonly thick while just seaward, peat sequences are thin. Vegetation composition and species diversity on the islands are dependent upon age and height above mean sea level. Saltmeadow cordgrass (Spartina patens) and sea oxeye (Borrichia frutescens) generally characterize young islands or those islands occasionally flooded by spring tides.

PB80-184005 PC A02
North Carolina State Univ. at Raleigh. Sea Grant Coll. Program.
Geomorphology, Washover History, and Inlet Zonation: Cape Lookout, N.C. to Bird Island, N.C.,
William J. Cleary, and Paul E. Hosier. c1979, 21p UNC-SGR-149, NOAA-80032806
Grant NOAA-04-6-158-44054
Pub. in Barrier Islands, p237-271 1979.

Seventeen islands and two mainland beaches comprise the 237 km shoreline between Cape Lookout and Bird Island, North Carolina. This area has been impacted by washovers chronically during the past 40 years and vegetation patterns suggest occurrences which predate 1900. Washover-related physiography includes a number of identifiable shoreline features which suggest a cyclic pattern of washover followed by recovery. Both physiographic and vegetational recovery patterns differ, depending upon the grain size distribution of the washover sediments. The interrelationships among washover potential, vegetation cover, and dune morphology have been used to develop a generalized model of the shoreline features and processes of the Cape Lookout to Bird Island section of North Carolina.

8H. Hydrology and Limnology

NUREG/CR-1244 PC A04/MF A01
Sandia Labs., Albuquerque, NM.
Impact of Rainstorm and Runoff Modeling on Predicted Consequences of Atmospheric Releases from Nuclear Reactor Accidents,
Lynn T. Ritchie, Warren D. Brown, and J. Robert Wayland. May 80, 70p SAND-79-0376

A general temperate latitude cyclonic rainstorm model is presented which describes the effects of washout and runoff on consequences of atmospheric releases of radioactive material from potential nuclear reactor accidents. The model treats the temporal and spatial variability of precipitation processes. Predicted air and ground concentrations of radioactive material and resultant health consequences for the new model are compared to those of the original WASH-1400 model under invariant meteorological conditions and for realistic weather events using observed meteorological sequences. For a specific accident under a particular set of meteorological conditions, the new model can give significantly different results from those predicted by the WASH-1400 model, but the aggregate consequences produced for a large number of meteorological conditions are similar.

PB80-168354 PC E03/MF E03
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Stability Analysis of Eutrophication Models.
Final rept.,
N. Adachi, and S. Ikeda. c1978, 47p RM-78-53
Prepared in cooperation with Kyoto Univ. (Japan). Dept. of Applied Mathematics and Physics.

This report has been prepared as a contribution to the modeling problem of the lake eutrophication process, which comprises nutrients and plankton prey-predator elements. The particular concern of this paper is the stability analysis of the ecological water quality system in connection with the effect of the environmental forcing function, as well as the diffusion effect.

PB80-169014 PC E03/MF E03
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
A Comparative Case Study of Dynamic Models for DO-BOD-Algae Interaction in a Freshwater River.
Final rept.,
M. B. Beck. cDec 78, 75p RR-78-19

The primary objective of this paper is the dissemination of a set of time-series field data suitable for the identification and verification of dynamic models for water quality. Here water quality is interpreted as the interaction between three variables: dissolved oxygen (DO) concentration--a broad measure of the healthy state, or otherwise, of a river; biochemical oxygen demand (BOD) concentration--a macro-measure of typical municipal/domestic organic waste materials; and a population of algae.

PB80-174501 PC A06/MF A01
Kansas Water Resources Research Inst., Manhattan.
Recent Gradational and Channel-Migration History of the Kansas River - A Guide for Floodplain Management.
Project completion rept. Oct 76-Sep 80.
Apr 80, 113p CONTRIB-213, W80-04600, OWRT-A-083-KAN(1)
Contract DI-14-34-0001-7035
Color illustrations reproduced in black and white.

Since 1976, studies of the history of migration of 725 channel miles of the Kansas River and major tributaries have proceeded under contract with the Kansas City District of the U.S. Army Corps of Engineers. An 85-mile reach from Topeka to Kansas City has been investigated for the Kansas Water Resources Research Institute. Historical data on channel shape and position have been acquired from published maps judged sufficiently accurate back into the 1850s. Scattered information about prehistoric courses was obtained by analysis of floodplain scrolls and abandoned channels visible on aerial photographs. The Corps has recently published an atlas of 41 maps that display changes in channel position by use of eleven colors. The 125-year record on the Kansas River reveals a spatial alternation of stable and unstable reaches.

PB80-175177 PC A09/MF A01
Arkansas Water Resources Research Center, Fayetteville.
Hydrogeologic and Geochemical Investigation of the Boone-St. Joe Limestone Aquifer in Benton County, Arkansas,
Albert E. Ogden. 1980, 193p PUB-68, W80-04603, OWRT-A-044-ARK(1)

Results from thirty-nine pumping tests and well samples were used to study the hydrogeology and hydrochemistry of an important shallow, surface exposed aquifer in northwest Arkansas, the Boone-St. Joe limestone aquifer. The aquifer has two formations, the upper Boone Limestone, and the lower St. Joe Limestone. Parameters determined by the pumping tests include permeability, coefficient of transmissibility, and specific capacity. Coefficient of transmissibility results varied from 24.8 to 24,640 gpd/ft and specific capacity ranged from 0.03 to 30 gpm/ft showing a large range in production capability. Groundwater from the aquifer is poor showing high fecal streptococcus counts and high levels of nitrates, chloride, phosphate and sulfate.

PB80-175292 PC A02/MF A01
North Dakota Water Resources Research Inst., Fargo.
Effects of Wetlands on Water Quality in the Devils Lake Basin, North Dakota.
Technical completion rept. Jul 76-Sep 79,
John J. Peterka. Oct 79, 22p W80-04607, OWRT-A-052-NDAK(1)
Contract DI-14-34-0001-8036
Sponsored in part by North Dakota State Univ., Fargo., and North Dakota Univ., Grand Forks.

Contributions of dissolved and particulate substances to the runoff from drained wetlands and agricultural lands were studied in the Starkweather Watershed of the Devils Lake Basin, North Dakota. The Starkweather coulee is the major drainage for the 997 sq km Starkweather Watershed. While various sites were used the primary site chosen for sampling was in a 0.50 ha Type IV wetland that normally contains water throughout the year. Although measurements were taken from 1976 through 1979, weather conditions such as drought made runoff sampling difficult. Various factors assessed include: changes in concentrations of substances in runoff with time following drainage, changes in soil nitrogen and phosphorus with time following drainage, trends in concentrations of dissolved and particulate substances both upstream and downstream, and measurements of major anions, cations, seston, conductivity, and pH.

PB80-175409 PC A06/MF A01
Utah Water Research Lab., Logan.
Characteristics of Nonpoint Source Urban Runoff and Its Effects on Stream Ecosystems.
Final rept.,
Donald B. Porcella, and Darwin L. Sorensen. Feb 80, 112p EPA-600/3-80-032

Literature on urban nonpoint source runoff was surveyed to determine the magnitude of the effects of that source of contaminants to stream ecosystems. Ecological literature provided a basis for evaluating such impacts based on benthic invertebrate biomass and diversity, measurement of community primary production and respiration, carbon cycling, and variables related to the contaminant concentrations in the stream.

PB80-175441 PC A03/MF A01
Geological Survey, St. Paul, MN. Water Resources Div.
Water Quality of Rogers Lake, Dakota County, Minnesota.
Water-resources investigations,
Mark R. Have. Jan 80, 41p USGS/WRD/WRI-80/018, USGS/WRI-80-5
Prepared in cooperation with Minnesota Dept. of Transportation, St. Paul.

Construction of an interstate highway is planned near Rogers Lake in Dakota County, Minn. Samples of water and bed material were collected at six sites during March 1976 to April 1978 to determine selected physical, chemical, and biological characteristics before construction. Samples were collected at least twice during each season of the year. Data derived from these samples will provide baseline information to aid in assessing the impact of highway construction on the water quality of the lake. Rogers Lake is separated into an upper and

lower lake by a culvert; both were eutrophic and dominated by blue-green algae year around. Analyses of water from Rogers Lake suggest that sodium and chloride concentrations were higher than in ground water or in water in some surrounding lakes. Sodium ranged from 7.2 to 55 milligrams per liter, and chloride ranged from 15 to 30 milligrams per liter.

PB80-175763 PC **A13**/MF **A01**
Geological Survey, Baton Rouge, LA. Water Resources Div.
Water Resources Data for Louisiana, Water Year 1979. Volume 3. Coastal Louisiana.
Water-data rept. 1 Oct 78-30 Sep 79.
Jan 80, 294p USGS/WRD/HD-80/016, USGS-WDR-LA-3
See also Volume 1, PB80-153299.

Water resources data for the 1979 water year for Louisiana consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. This report, in three volumes, contains records for water discharge at 78 gaging stations (including stage for 72 of these stations); stage only for 42 gaging stations and 10 lakes; contents for 1 reservoir; water quality for 146 surface-water stations (including 22 gaging stations, 52 miscellaneous sites, and 24 lakes), and 335 wells; and water levels for 685 observation wells. Also included are data for 212 crest-stage and flood profile partial-record stations.

PB80-175946 PC **A10**/MF **A01**
North Carolina State Univ. at Raleigh.
Probability Sampling to Measure Pollution from Rural Land Runoff.
Final rept. Jul 74-Dec 78,
F. J. Humenik, D. W. Hayne, M. R. Overcash, J. W. Gilliam, and A. M. Witherspoon. Feb 80, 215p EPA-600/3-80-035
Grant EPA-R-803328

The feasibility of probability sampling in describing quality of rural water not affected by point sources is examined. The study site was a portion of the Chowan River Basin in Virginia and North Carolina. Flow was measured along with dissolved oxygen, temperature, conductivity, and pH. All samples were analyzed for nitrate plus nitrite nitrogen, total Kjeldahl nitrogen, total phosphate and chloride. Flow was highly variable in time and space; concentration was less so.

PB80-176134 PC **A08**/MF **A01**
Montana State Univ., Bozeman. Water Resources Research Center.
Limnological Studies in Montana: Hyalite Reservoir and Responses of Lotic Periphyton to Deep-Water Discharges, Grazing and Logging,
M. D. Marcus, J. E. Schilling, and D. G. Stuart. Aug 78, 162p 92, W80-04670, OWRT-C-7054(6207)(2)
Contract DI-14-34-0001-6207

Physical, biological and chemical parameters were studied at three sites from May 18 to October 16, 1976, to develop limnological data for Hyalite Reservoir in Southcentral Montana. Physio-chemical parameters and periphyton dynamics were investigated at a number of sites on three creeks in the vicinity of Bozeman, Montana, to evaluate impacts on water quality from (1) deep-water discharges, (2) logging activities, and (3) cattle grazing. Nutrient concentrations were greatest near the reservoir outlet and were strongly influenced by wind action and the deep-water discharge. Highest chlorophyll a concentrations and primary production occurred nearest the dam. An Aphanizomenon flos-aquae bloom in the reservoir appeared to result from low nitrogen and carbon dioxide concentrations. Primary production in the reservoir and at stream sites was also nitrogen limited. Reservoir discharges releasing nitrogen stimulated periphytic productivity, improved the physiological condition of the primary producers and increased diatom species diversity.

PB80-176464 PC **A11**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV.
Trophic Classification of Selected Illinois Water Bodies: Lake Classification Through Amalgamation of LANDSAT Multispectral Scanner and Contact-Sensed Data.
Final rept. 1976-78,
D. H. P. Boland, David J. Schaeffer, Donna F. Sefton, Robert P. Clarke, and Richard J. Blackwell. Dec 79, 246p EPA-600/3-79-123
Sponsored in part by Illinois State Environmental Protection Agency, Springfield., and Jet Propulsion Lab., Pasadena, CA.

A project was initiated to determine the feasibility of assessing and classifying a group of Illinois lakes through the utilization of a combination of contact- and satellite-acquired data. LANDSAT multispectral scanner (MSS) digital multidate data for 145 Illinois lakes were extracted from computer-compatible tapes and adjusted through regression analysis to a common acquisition date. Next, MSS lake pixel counts were converted to lake surface area estimates. Regression models employing transformed Mss bands as independent variables were developed for the estimation of several water quality parameters and two multivariate trophic state indices. The water quality parameter estimates were then used to develop lake rankings that, when evaluated, were found to be in general agreement with ancillary data. Complete linkage-based cluster analyses of the raw MSS data and the LANDSAT-derived water quality parameter estimates for the 145 lakes resulted in the identification of physically significant lake groups.

PB80-176951 PC **A04**/MF **A01**
Geological Survey, Tallahassee, FL. Water Resources Div.
Evaluation of Remote Hydrologic Data-Acquisition Systems, West-Central Florida.
Water-resources investigations,
J. F. Turner, Jr., and W. M. Woodham. Feb 80, 71p USGS/WRD/WRI-80/020, USGS/WRI-79-102
Prepared in cooperation with Southwest Florida Water Management District.

This study provides an evaluation of the hydrologic applications of a land-line and two satellite data-relay systems operated during 1977-78 in the Southwest Florida Water Management District. These systems were tested to evaluate operational and reliability characteristics. Telephone lines were used to relay data in the land-line system, and the Geostationary Operational Environmental Satellite (GOES) and Land satellite (Landsat) were used in the satellite system. The land-line system was tested for a period of 15 months at a streamflow site. Accurate data were obtained 94 percent of the time during the test period. Data losses were attributed to telephone-line interference, low-battery voltage, and vandalism. The GOES system was tested at a rainfall site for a 17-month period.

PB80-180185 PC **A02**
National Environmental Satellite Service, Washington, DC.
Some Improvements to the Scofield/Oliver Technique,
Roderick A. Scofield, and Vincent J. Oliver. Mar 80, 9p NOAA-80040701
Pub. in Preprint Volume, Conference on Flash Floods (2nd), held at Atlanta, GA, on March 18-20, 1980, p115-122.

This paper presents improvements to the Scofield/Oliver technique with examples on how these improvements are used in the estimation process and discusses additional types of thunderstorms that need to be considered in the near future. It is shown why the saturated environment factor, the divergence aloft factor, and the precipitable water factor should be used and how they are to be incorporated in the technique. These new meteorological factors will continue to be tested as well as the original ones by established an ongoing verification system. Such a system will determine whether or not a particular meteorological factor should be used in the technique.

PB80-180193 PC **A02**
National Environmental Satellite Service, Washington, DC.
Satellites and the Appalachian Flash Flooding of July 15, 1979,
Stanley R. Schneider, and Roderick A. Scofield. Mar 80, 7p NOAA-80040702
Pub. in Preprint Volume, Conference on Flash Floods (2nd), held at Atlanta, GA, on March 18-20, 1980, p91-96.

During the early morning hours of July 15, 1979, severe thunderstorm activity caused flash flooding along the Virginia-West Virginia-Kentucky border. The next SIM (6 hours later) from Washington, DC was released three hours after the most intense phase of the storm. This paper provides a review of meteorological events on the morning of July 15, 1979 as seen from the vantage point of the SMS-2 satellite, with corrobative data provided by the radar stations.

PB80-184179 PC **E02**/MF **A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Lake Erie Chemical and Physical Characteristics Data for 1967.
Data rept.,
Gerald L. Bell. Jan 80, 16p NOAA-DR-ERL-GLERL-4, GLERL-CONTRIB-170, NOAA-80032114

Water samples at standard depths, bottom sediment and meteorological data were collected in Lake Erie at established stations in the course of three cruises during the 1967 open-water season. The sampling program and analytical methods are described. Chemical characteristics of the water and bottom sediment are listed by cruise for each station and sampling depth. Wind, wave, and sediment biological oxygen demand (BOD) data are listed by cruise for each station. The statistical summaries showing lake-wide means, standard deviations, and sample sizes of selected variables are presented by depth for each cruise period.

8I. Mining Engineering

AD-A083 159/4 PC **A03**/MF **A01**
Naval Weapons Center China Lake CA
Evaluation of Geothermal Potential of Range Bravo 17 and the Shoal Site, Naval Air Station, Fallon.
Final rept. Oct 78-Sep 79,
J. A. Whelan, C. R. Rodgers, J. Brown, and Jack Neffewa. Mar 80, 39p Rept no. NWC-TP-6142

As part of the task of evaluating the geothermal potential of naval installations throughout the world, Range Bravo 17 and the Shoal Site, both located at the Naval Air Station, Fallon, Nev., were evaluated. An aeromagnetic survey was conducted; seismic refraction studies and extensive hydrologic studies were made; thermal gradient and heat flow data were taken; and water chemistry and mercury geochemistry analyses were made. The results of the study show that the geothermal potential of the Shoal area and Range Bravo 17 is low. It was concluded that further exploration of these sites is not warranted at this time. (Author)

APL/JHU/QM-77-129-3 PC **A04**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Eastern Gulf Coastal Plain: A Scenario for Geothermal Energy Development.
Feb 78, 59p
Contract EX-76-A-36-1008

A scenario for the development of potential geothermal resources in the Eastern Gulf Coastal Plain states of Mississippi, Alabama and Florida is explained and discussed. A description of the resources and the nature of the potential applications and energy market in this region are given. A ranking of the resources as to their energy content, potential market, etc., is described, and the assumptions and strategy used to generate the scenario are discussed. A more complete report on the detailed aspects involved in the preparation of the development scenario will be issued in the near future. (ERA citation 05:013389)

CONF-7910117-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Multidisciplinary Approach to Reclamation of Abandoned Refuse Sites.
S. Zellmer, and M. Wilkey. 1979, 13p
Contract W-31-109-ENG-38
Coal conference and EXPO V, Louisville, KY, USA, 23 Oct 1979.

The Staunton 1 Reclamation Demonstration Project involves an evaluation of the reclamation process at an abandoned coal mine refuse site in southwestern Illinois. A multidisciplinary team of scientists and engineers selected the site, collected baseline environmental data, determined the final land use, and developed and implemented detailed engineering plans. Refuse material at the 34-acre site was recontoured and covered to a minimum depth of one foot with soil obtained onsite. This same multidisciplinary approach is being used to evaluate post-construction environmental conditions at the site. Current investigations are monitoring conditions related to groundwater, surface water, aquatic ecosystems, revegetation, soils, erosion and runoff, soil microbial populations, and wildlife invasion. Information collected to date indicates that a significant improvement has occurred in the environmental quality of the site. The economic potential of the site is also being investigated and documented; a substantial increase in the economic potential of the site and adjacent properties has been recorded. The project is demonstrating methods that can be used to reclaim abandoned coal refuse sites and is providing design for future reclamation efforts of this type. (ERA citation 05:012516)

CONF-800210-1 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Geothermal Direct Use Projects.
E. G. DiBello. 1980, 22p
Contract EY-76-C-07-1570
IEEE Region 6 conference, San Diego, CA, USA, 20 Feb 1980.

The early commercialization of hydrothermal energy is being aided by the implementation of demonstration projects that are funded on a cost sharing basis by the Department of Energy. A total of twenty-two projects designed to demonstrate the technical and economic feasibility of the direct use of geothermal fluids are presently underway in the United States. The type and complexity of these projects vary from space heating and grain drying to food processing. By encouraging further geothermal development, environmental, technical, operational and economic information will be generated that will assist the near-term commercialization of this valuable resource. (ERA citation 05:013433)

COO-4362-5 PC **A06**/MF **A01**
Arizona Univ., Tucson. Bureau of Geology and Mineral Technology.
Geothermal Reservoir Site Evaluation in Arizona. Semi-Annual Progress Report, July 15, 1978-January 15, 1979.
W. R. Hahman, Sr. Mar 79, 101p
Contract EG-77-S-02-4362

Four papers are included. Separate abstracts were prepared for each one. (ERA citation 05:011708)

DOE/ET/27002-5 PC **A03**/MF **A01**
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab.
Strategy of Exploration for High Temperature Hydrothermal Systems in the Basin and Range Province.
S. H. Ward, H. P. Ross, and D. L. Nielson. Dec 79, 46p
Contract EG-78-C-07-1701

A fifteen phase strategy of exploration for high temperature convective hydrothermal resources in the basin and range province, recommended herein, features a balanced mix of geological, geochemical, geophysical, hydrological, and drilling activities. The strategy is based on a study of data submitted under the Department of Energy's Industry Coupled Case Study Program. Justification for inclusion in or exclusion from the strategy of all pertinent geoscientific methods is given. With continuing research on methods of exploration for and modeling of convective hydrothermal systems, this strategy is expected to change and become more cost-effective with time. Variations on the basic strategy are to be expected where the geology or hydrology requires it. Personal preferences, budgetary constraints, time and land position constraints, and varied experience may cause industrial geothermal exploration managers to differ with our strategy. For those just entering geothermal exploration, the strategy is expected to be particularly useful. (ERA citation 05:015496)

DOE/ET/28404-1 PC **A09**/MF **A01**
Westinghouse Electric Corp., Baltimore, MD. Electronic Products and Services Div.
Development of Advanced Electromagnetic Exploration System. Final Report.
Aug 79, 193p
Contract ET-78-C-07-1702

The electronics system design for both the transmitting system and the receiving system, the laboratory test results obtained on the system completed thus far, and the effort needed to complete the system are detailed. (ERA citation 05:013398)

DOE/ID/12010-1 PC **A02**/MF **A01**
Idaho State Office of Energy, Boise.
Idaho Geothermal Commercialization Program. Semi-Annual Report, January-June 1979.
D. W. McClain, and W. B. Eastlake. 1979, 19p
Contract FC07-79ID12010

The task accomplished during the first six months of the cooperative agreement between the US Department of Energy and the Idaho Office of Energy is summarized, concentrating on geothermal resource data, regional and local development plans, energy and economic factors and institutional factors. (ERA citation 05:011712)

DOE/ID/12013-1 PC **A03**/MF **A01**
Wyoming Univ., Laramie.
Wyoming Geothermal Commercialization Planning. Semi-Annual Progress Report, January 1, 1979-June 30, 1979.
R. W. James. 1979, 45p
Contract FC07-79ID12013

The objectives, project tasks, and specific task descriptions and products are reviewed. The resource assessment data for the state is not available and the planning activity is based on speculation at this date. (ERA citation 05:011744)

DOE/ID/12014-1 PC **A05**/MF **A01**
Montana Dept. of Natural Resources and Conservation, Helena.
Montana Geothermal Commercialization Planning. Semi-Annual Progress Report, January 1, 1979-June 30, 1979.
J. Birkby, K. Brown, and M. Chapman. 1979, 82p
Contract FC07-79ID12014

Area development plans were prepared which describe geothermal resources and their potential use on a county or multicounty basis. Development plans for two areas are presented. Cost analyses show that the proximity of the geothermal resource to the end user is the most important criterion in geothermal energy development. Thirteen tentative site-specific plans are being revised. The analysis of institutional factors affecting geothermal development, the outreach, and the state geothermal are discussed briefly. (ERA citation 05:011745)

DOE/ID/12015-1 PC **A05**/MF **A01**
Arizona Solar Energy Research Commission, Phoenix.
Arizona Geothermal Commercialization Planning. Semi-Annual Progress Report, January 1, 1979-June 30, 1979.
R. Hahman, Sr., D. White, L. Goldstone, F. Mancini, and M. Chehab. 1979, 96p
Contract FC07-79ID12015

The major projects undertaken include: the provision of a State Institutional Handbook, the provision of in-depth geothermal resource data, the comparison of energy sources and uses, economic data compilation for area development plans, the preparation of site-specific development plans, and the outreach program. Progress is reported on each of these projects. (ERA citation 05:011746)

DOE/ID/12016-1 PC **A06**/MF **A01**
Utah Div. of Water Rights, Salt Lake City.
Utah Geothermal Commercialization Planning. Semi-Annual Progress Report, January 1, 1979--June 30, 1979.
S. Green, and L. W. Wagstaff. 1979, 124p
Contract FC-7-79ID12016

The effects of the Utah geothermal planning project were concentrated on the Utah geothermal legislation, the Roosevelt Hot Springs time phased project plan and the Salt Lake County area development plan. Preliminary findings indicate a potential for heat pump utilization, based on market interest and the existence of suitable groundwater conditions. (ERA citation 05:013409)

DOE/ID/12017-1 PC **A06**/MF **A01**
New Mexico Energy and Minerals Dept., Santa Fe.
New Mexico Geothermal Commercialization Planning. Semi-Annual Progress Report, January 1, 1979-June 30, 1979.
P. Rodriguez, G. Scudella, and D. Fedor. 1979, 124p
Contract FC07-79ID12017

The market potential for geothermal energy development in New Mexico is estimated. Barriers to market penetration and geothermal development initiatives were identified. Statutes and regulations affecting geothermal development are appended. (ERA citation 05:012053)

DOE/ID/12018-1 PC **A05**/MF **A01**
Colorado Geological Survey, Denver.
Colorado Geothermal Commercialization Planning. Semi-Annual Progress Report, January 1, 1979-June 30, 1979.
B. A. Coe. 1979, 95p
Contract FC07-79ID12018

The potential for developing the geothermal resources of Colorado is detailed. Constraints that are limiting geothermal energy development are described. Area development plans, an institutional analysis, and the outreach program are presented. (ERA citation 05:011747)

DOE/MC/10516-T4 PC **A02**/MF **A01**
Geological Survey, Reston, VA.
Shale Characterization and Resource Appraisal of the Devonian Black Shale of the Appalachian Basin. Annual Report for FY 1979, October 1, 1978-September 30, 1979.
W. de Witt. 1979, 12p
Contract AI21-79MC10516

Progress in the USGS Devonian Shale Characterization and Resource Appraisal Program covered the following: stratigraphy, geophysics, geochemistry (source bed and trace elements), structural studies, paleontology (conodont maturation), data system, clay mineralogy, and resource appraisal. (ERA citation 05:013080)

DOE/MC/10516-T5 PC **A03**/MF **A01**
Geological Survey, Denver, CO.
Appalachian Basin Devonian Black Shales: Regional Organic Geochemistry and Hydrocarbon Genesis.
G. E. Claypool, and C. N. Threlkeld. 24 Oct 79, 28p
Contract AI21-79MC10516

This report emphasizes the geochemical results most relevant to regional evaluation of the Devonian black shale as a source of natural gas. The data tabulated include headspace gas analyses, organic carbon content, thermochemical evolution, pyrolytic hydrocarbon-to-organic carbon ratio, and stable C isotope ratio in methane. (ERA citation 05:013081)

FE-1231-17 PC **A04**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mining and Minerals Engineering.
Design Optimization in Underground Coal Systems. Interim Report, April-June 1979.
C. Haycocks, C. Breeds, and M. Karmis. Oct 79, 65p
Contract EX-76-C-01-1231

A three-dimensional finite-element program, capable of modelling the pre- and post-yield characteristics of rock materials, has been completed and tests show it to be operating satisfactorily. Uniaxial, compression testing of coal samples is nearly complete and has been augmented by extensive field collections. Coal samples, both large and small, have been collected from numerous seams allowing data and conclusions to be interrelated for each seam. This should prove to be invaluable not only as an absolute data bank but also in comparing results obtained by previous investigators.

A comparison between the strength data of cylindrical and cubical specimens is now complete. This will allow the practicing engineer to employ data from core testing in existing pillar-design equations, which are based on strengths of cubical specimens. Additionally, new design equations may be critically compared to existing equations. The completion of the three-dimensional, finite-element computer program, which can model rock behavior up to and beyond the failure point, has been a major step in the longwall research. It facilitates the analysis of the entire longwall area including the tail entry. This work will also be used to research the structural characteristics of coal, and it will mesh with the development of the longwall simulator. It was found that the length of a longwall panel is not a critical variable. The width of a panel - the length of a longwall face - however varies according to the objectives. A hypothetical case study indicated that the optimal face length varies between 270 and 550 feet. (ERA citation 05:014732)

FE-1747-8 PC **A05**/MF **A01**
Equity Oil Co., Salt Lake City, UT.
BX In Situ Oil Shale Project. Quarterly Technical Progress Report, March 1-May 31, 1979.
20 Jun 79, 85p
Contract ET-78-F-03-1747
Portions of document are illegible.

During the quarter, construction and checkout of Project facilities were completed and Environmental Monitoring and laboratory work continued. Prestartup tasks were completed and a meeting was held to review Project status with all Project personnel. At the end of the quarter all permitting requirements for Project operaton had been met. (ERA citation 05:013101)

FE-3242-15 PC **A02**/MF **A01**
General Electric Corporate Research and Development, Schenectady, NY.
Laminar Flow Cyclone Development Program. Quarterly Technical Progress Report, October 1, 1979-December 31, 1979.
W. B. Giles, and K. L. Bekofske. Jan 80, 6p
Contract ET-78-C-01-3242

The principal constraint to high Reynolds number operation is due to boundary layer instability in the radial inflow region. Therefore, a modified model has been built to study the influence of inlet wall heating with the water flow model. Also, a higher facility flow capacity now allows experiments at higher Reynolds number. (ERA citation 05:014745)

FE-9033-T1 PC **A17**/MF **A01**
Transflux International Ltd., Fort Lee, NJ.
Evaluation of Alternate Hydraulic Transport Concepts for Coal Haulage in Underground Mines.
S. M. Szekely, M. G. Kurz, and T. M. Yegulalp.
Nov 79, 380p
Contract ET-76-C-01-9033

A cost data bank and two computer programs developed as part of this study allow the user to select an economical pipe configuration for a multi-panel underground coal slurry transport system. The feasibility and controllability of such a system had been proven in previous studies. The programs allow the user to update the data bank and vary otherwise the inputs to meet a wide variety of conditions. Using the programs and a set of predetermined conditions, a number of computer runs were made. These runs selected economic pipe, pump, and surge volume configurations for 2, 4, and 8 section mines. It was assumed that one continuous miner operates in each section, with possibly simultaneous full output. One set of runs was based on a set miner cycle time while another on cycles developed by stochastic probability analysis. The first runs were using a system operated with fixed flow rates while the other with variable flows. The second set of conditions offered only insignificant cost advantages for a given configuration. The results indicate considerable cost advantages toward larger and more complex systems using a minimum number of pipe and pumps, since first cost is the overwhelmingly significant cost factor. The effect of size attrition on a coal preparation plant and on plant operations has also been addressed. It was found to increase both complexity and expenses but without significant increase in total mine mouth coal cost. (ERA citation 05:014733)

FE-9040-1(App.3) PC **A04**/MF **A01**
Engineers International, Inc., Downers Grove, IL.
Technical Assessment of Patents Related to Underground Coal Mine Haulage. Appendix III: Other.
M. M. Singh, J. S. Jaspal, R. L. Presti, R. T. Hair, and G. A. Yates. Nov 78, 71p
Contract ET-76-C-01-9040

A number of patents related to underground mine haulage are described briefly, with comments and diagrams. (ERA citation 05:013008)

GJBX-22(80) PC **A17**/MF **A01**
Helium Surveys, Inc., Grand Island, NY.
Helium Emanometry as an Indicator of Deeply Buried Uranium Deposits.
L. A. Pogorski, and G. S. Quirt. Dec 79, 389p
Contract EY-76-C-13-1664

Helium emanometry has considerable potential for locating deeply buried uranium deposits. In order to determine whether near surface helium-4 anomalies are present over and in close proximity to deeply buried uranium deposits, helium measurements were carried out at three sites having known uranium ore bodies: the Red Desert in Sweetwater County, Wyoming; Copper Mountain in Fremont County, Wyoming; and Spokane Mountain in Stevens Couty, Washington. At each research site, near surface soil and soil gas (probe) samples were collected. Borehole water and soil gas (collector) samples were also taken at selected locations. The samples were analyzed at the laboratory for their helium, light hydrocarbon, and nitrogen content. In most instances it was not necessary to correct the soil gas data. In determining the quantity of helium-4 present in the soil gas samples, the practical precision was +- 50 ppb. The reproducibility of the helium-4 analyses of the water samples varied from +- 5% to +- 20%. The total error in the calculated soil helium-4 levels ranged from 5% to 10% of the value. The calculated corrected soil, water and oil gas helium-4 results were analyzed employing statistical techniques in order to separate the background and anomalous populations. The anomalous population was divided into five subsets for purposes of data presentation. The data are then presented in the form of histograms, dot maps and anomaly contour density maps.One can conclude that the results from this study confirm that near surface helium anomalies are present in the gas of the soil micropores overlying three types of uranium deposits situated in widely differing geological environments. The data obtained from the soil gas (probe) helium samples are also encouraging in that anomalies were found to be present over portions of the known extent of each of the three deposits. (ERA citation 05:013123)

GJBX-29(80)(Pt.1) PC **A04**/MF **01**
Oak Ridge Gaseous Diffusion Plant, TN.
Hydrogeochemical and Stream Sediment Detailed Geochemical Survey for Trans-Pecos, Texas. Terrell Survey Area.
T. R. Butz, A. G. Payne, J. G. Grimes, R. N. Helgerson, and C. S. Bard. 15 Nov 79, 71p K/UR-29(Pt.1)
Contract EY-76-C-13-1664

Results of the Terrell survey area portion of the detailed geochemical survey for Trans-Pecos, Texas are reported. Field and laboratory data are presented for 36 groundwater and 158 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are given. A generalized geologic map of the survey area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. Groundwaters reflecting concentrations of uranium greater than or equal to 5.0 ppB occur in three wells north of Dove Mountain in the western portion of the survey area and two wells west of Dryden Crossing in the eastern portion, all producing from Lower Cretaceous units. Groundwater collected in the western portion of the survey area compared to those collected in the eastern portion are being influenced by conate and saline waters. Groundwaters in the eastern portion of the survey area show a relative abundance of uranium which is independent of variables indicative of increased salinity and total dissolved solids. Stream sediments containing greater than or equal to 2.57 ppM soluble uranium are located in the Indian Creek Catchment and streams entering Sanderson Canyon in the eastern portion of the survey area. These sediments are derived from the uppermost Comanchean and lowermost Gulfian rocks of the Cretaceous System. Above background concentrations of arsenic, selenium, vanadium, copper, nickel, and strontium are observed for samples containing above background concentrations of soluble uranium. This association provides the best indication of possible uranium mineralization in the Terrell survey area. (ERA citation 05:014890)

GJBX-29(80)(Pt.2) PC **A11**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Hydrogeochemical and Stream Sediment Detailed Geochemical Survey for Trans-Pecos, Texas. Solitario Survey Area.
T. R. Butz, A. G. Payne, J. G. Grimes, R. N. Helgerson, and C. S. Bard. 15 Nov 79, 249p K/UR-29(Pt.2)
Contract EY-76-C-13-1664

Results of the Solitario survey area portion of the detailed geochemical survey for Trans-Pecos, Texas are reported. Field and laboratory data are presented for 119 groundwater and 520 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are given. A generalized geologic map of the survey area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. Groundwaters having concentrations of uranium greater than or equal to 11.5 ppB are observed in the western half of the survey area. These wells generally produce from the Chisos Formation and Buck Hill Volcanic Series or alluvium derived from these units. Lithium, sodium, boron, uranium/specific conductance, uranium/boron, and uranium/sulfate are noted to be most highly associated within the area of anomalously high uranium. The highest potential for uranium mineralization, in view of these groundwater data, lies in the LaVuida and Bandera Mesa areas. Stream sediments containing greater than or equal to 2.57 ppM soluble uranium occur in numerous areas within the survey area. The highest concentrations of uranium occur in sediments derived from the Buck Hill Volcanic Series and Cretaceous limestones. Above background concentrations of arsenic, selenium, molybdenum, nickel, calcium, and strontium were noted to be associated with areas of anomalously high uranium. These elements are most prominently associated with uranium anomalies occurring in Cretaceous limestone. (ERA citation 05:014891)

GJBX-29(80)(Pt.3) PC **A09**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Hydrogeochemical and Stream Sediment Detailed Geochemical Survey for Trans-Pecos, Texas. Sierra Vieja Survey Area.
T. R. Butz, A. G. Payne, J. G. Grimes, R. N. Helgerson, and C. S. Bard. 15 Nov 79, 180p K/UR-29(80)(Pt.3)
Contract EY-76-C-13-1664

Results of the Sierra Vieja survey area of the detailed geochemical survey for Trans-Pecos, Texas are reported. Field and laboratory data are presented for 29 groundwater and 240 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are given. A generalized geologic map of the survey area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. Highest concentrations of uranium in groundwater predominantly occur in areas marginal to the Rio Grande. These wells and spring produce from Quaternary alluvium or the Vieja Group. High specific conductance is also associated with most of the wells located marginal to the Rio Grande. The specific conductance of wells in other areas with greater than or equal to 11.5 ppB uranium are notably lower. Higher than background concentrations of molybdenum, arsenic, and vanadium are observed with wells containing greater than or equal to 11.5 ppB uranium. Total alkalinity

and pH display a variable distribution throughout the survey area. Stream sediment from several areas contain greater than or equal to 2.57 soluble uranium. In areas where these concentrations account for greater than or equal to 83% of the uranium present in the sediment, above background concentrations of sodium, aluminum, barium, potassium, zirconium, cerium, and strontium are detected. The degree to which these elements are associated with favorably high uranium concentrations is related to the relative amounts of volcaniclastic and calcareous sedimentary material incorporated in the sample. (ERA citation 05:014892)

GJBX-29(80)(Pt.4) PC **A12/MF A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Hydrogeochemical and Stream Sediment Detailed Geochemical Survey for Trans-Pecos, Texas. Tascotal Survey Area.
T. R. Butz, A. G. Payne, J. G. Grimes, R. N. Helgerson, and C. S. Bard. 15 Nov 79, 255p K/UR-29(Pt.4)
Contract EY-76-C-13-1664

Results of the Tascotal survey area portion of the detailed geochemical survey for Trans-Pecos, Texas are reported. Field and laboratory data are presented for 337 groundwater and 611 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are given. A generalized geologic map of the survey area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. Groundwaters containing greater than or equal to 80.0 ppB uranium were detected in three areas largely producing from acidic volcanoclastics in the south central portion of the survey area. High specific conductance and an association of lithium, selenium, and sodium were observed in these areas of anomaiously high uranium. High uranium/specific conductance, uranium/boron, and uranium/sulfate ratios are also associated with areas of the highest uranium concentrations. Alkalinities in these areas were noted to be highly variable over short distances within the same hydrologic unit. Stream sediments containing greater than or equal to 2.57 ppM soluble uranium are located in the southwestern and the north and south central portions of the survey area. High U-FL/U-NT and low thorium/U-NT values are observed with sediments derived from acidic volcanics in the southern portions of the survey area. In areas of anomalously high uranium, an association of above background concentrations of thorium, lithium, potassium, beryllium, and zirconium were noted. In view of these data, areas containing the Buck Hill Volcanic Series, the Mitchell Mesa, and Tascotal Formations provide the best possibilities of an economical uranium deposit. (ERA citation 05:014893)

GJBX-34(80) MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Hydrogeochemical and Stream Sediment Detailed Geochemical Survey for Texas Gulf Coast.
T. R. Butz, T. R. Putney, C. S. Bard, R. N. Helgerson, and J. G. Grimes. 15 Jan 80, 201p K/UR-30
Contract W-7405-ENG-26
Portions of document are illegible.
Microfiche copies only.

Results of the Texas Gulf Coast detailed geochemical survey are reported. New field and laboratory data are presented for 819 groundwater and 125 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are provided. A generalized geologic map of the survey area is provided and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. Groundwater data indicate that uranium concentrations greater than or equal to 2 ppb occur in samples in the southwestern Guadalupe County, Parita, and Lytle areas in water from the Wilcox Group. In the Lytle area, reducing groundwater occurs in the vicinity of an oil field above an up to the coast fault. Samples immediately north of the fault contain high uranium values while uranium values in the area of reduced waters are low. Areas containing samples with greater than or equal to 2 ppb from the Carrizo Formation occur in the vicinity of LaPryor and the Frio River. Areas of high uranium concentrations are generally associated with indicators of saline water and pathfinders for sandstone-type uranium deposits (molybdenum, vanadium, and selenium). Stream sediment data indicate that high uranium values (> 3.4 ppm) in sediment from the Carrizo, Reklaw, and Queen City Formations are associated with resistate minerals in those units. Most samples had low U-FL/U-NT values and only a few samples had high concentrations of leachable uranium. (ERA citation 05:014895)

GJBX-39(80)(V.2)(Sault)
PC **A07/MF A01**
EG and G GeoMetrics, Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Minnesota Project, Sault Sainte Marie and Blind River Quadrangles, Michigan. Final Report.
Feb 80, 134p
Contract EY-76-C-13-1664

The Sault Sainte Marie and Blind River 1 exp 0 x 2 exp 0 quadrangles of Michigan are covered almost everywhere (United States only) with Wisconsin age glacial deposits (moraines, outwash, lake deposits, etc.) of variable thickness. Where exposed, bedrock is of Early and Middle Paleozoic age, and consists almost entirely of limestone and dolomite. There are no uranium deposits (or occurrences) known within the study area, though the Elliott Lake quartz pebble conglomerate uranium deposit lies in the Canadian section of the Blind River quadrangle. Magnetic data illustrate relative depth to magnetic basement in the area. Sources appear more shallow to the east. Twelve groups of uranium samples were defined as anomalies and are discussed briefly in this report. None of them are considered significant. Radiometric data indicate a strong contrast in the character of glacial outwash between the eastern and western portions of the upper peninsula region. (ERA citation 05:014903)

GJBX-7(80) PC **A07/MF A01**
Utah Univ., Salt Lake City. Dept. of Mechanical and Industrial Engineering.
Comparative Study on the Impact of Coal and Uranium Mining, Processing, and Transportation in the Western United States.
G. M. Sandquist. Jun 79, 150p
Contract EY-76-C-13-1664

A comparative study and quantitative assessment of the impacts, costs and benefits associated with the mining, processing and transportation of coal and uranium within the western states, specifically Arizona, California, Colorado, Montana, New Mexico, Oregon, Utah, Washington and Wyoming are presented. The western states possess 49% of the US reserve coal base, 67% of the total identified reserves and 82% of the hypothetical reserves. Western coal production has increased at an average annual rate of about 22% since 1970 and should become the major US coal supplier in the 1980's. The Colorado Plateau (in Arizona, Colorado, New Mexico and Utah) and the Wyoming Basin areas account for 72% of the $15/lb U sub 3 O sub 8 resources, 76% of the $30/lb, and 75% of the $50/lb resources. It is apparent that the West will serve as the major supplier of domestic US coal and uranium fuels for at least the next several decades. Impacts considered are: environmental impacts, (land, water, air quality); health effects of coal and uranium mining, processing, and transportation; risks from transportation accidents; radiological impact of coal and uranium mining; social and economic impacts; and aesthetic impacts (land, air, noise, water, biota, and man-made objects). Economic benefits are discussed. (ERA citation 05:011367)

HIG-78-6 PC **A04/MF A01**
Hawaii Inst. of Geophysics, Honolulu.
Hydrology and Geochemistry of a Hawaiian Geothermal System: HGP-A.
P. M. Kroopnick, R. W. Buddemeier, D. Thomas, L. S. Lau, and D. Bills. May 78, 69p
Contract EY-76-C-03-1093

A water quality monitoring program of the Hawaii Geothermal Project well A (HGP-A) was conducted for downhole depth samples and continuous discharge samples in 1976 to 1977. The well water was slightly saline (about 5 to 10 percent ocean water) and nearly depleted of magnesium, but contained high concentrations of silica and sulfide. The chemical composition of the well water did not vary much with depth even though the sampling reached the well bottom (approximately 1768 m (5800 feet) below sea level). The well fluid temperature was higher than that of any Hawaii ground water; a maximum of 358 exp 0 C (676 exp 0 F) was recorded at the bottom of the well. The water was low in tritium but unexpectedly high in carbon-14 when compared with the surrounding ground water (sampled as cose as approx. 1609 km (1 mile) away). Mass balance calculations involving carbon and its isotopes are consistent with a model proposing that 13 percent of recharge is from sea water. During continuous flow tests, the total well yield was 83,400 lb of steam per hour, equivalent to approx. 150 gpm with 70 percent steam and the rest water. For most constituents measured, there was a one to three day buildup period before approach to a steady state concentration. Water quality data, coupled with other measurements, indicate that the well is either poorly developed or located in a formation of low transmissivity. The moderately high rainfall and high surficial permeability allow substantial rain water infiltration. Actual subsurface water circulation is open to interpretation because of our uncertainty about geologic formations. Geophysical evidence suggests that deep dikes or intrusive bodies may be located on the ocean side of the well; such barriers would retard the encroachment of sea water into the well. (ERA citation 05:013391)

ID-1601-T15 PC **A02/MF A01**
Utah Univ., Salt Lake City. Dept. of Geology and Geophysics.
Geothermal Research, Roosevelt Hot Springs Area. Quarterly Progress Report, May 1-July 31, 1978.
J. R. Bowman, F. H. Brown, and K. L. Cook. 1978, 9p
Contract EY-76-S-07-1601

Completed research programs are listed. Brief status reports are given on those still in progress. The program budget is shown. (ERA citation 05:011721)

IDO-1540-T2 PC **A03/MF A01**
Idaho National Engineering Lab., Idaho Falls.
Idaho Geothermal Development Projects. Annual Report for 1976.
1976, 39p
Contract EY-76-C-07-1540

A third successful well in Raft River was completed, to 6000 ft, striking a 149 exp 0 C (300 exp 0 F) reservoir, at less cost than either of the other two wells, despite being drilled in a formation of lower productivity. This well employed a special multiple channel drilling technique, which in retrospect was necessary to make the well useful for production of fluids. Two successful wells of shallow depth (1200 ft) were also finished in Boise this summer, both producing artesian flows of the predicted temperature, 75 exp 0 C (167 exp 0 F). The sources in tapping both the Raft River and Boise geothermal reservoirs was followed by an extensive reservoir monitoring program. By-product uses of the Raft River geothermal water received season long testing for irrigation of crops and for fish culture. Both results were highly encouraging. In Boise, the success of the two shallow wells and some design innovations lead to the conclusion that providing geothermal space heat to the capitol and other state-owned buildings could be a major economic success if double or triple the number of buildings could be served. (ERA citation 05:013435)

IDO-1701-T1 PC **A09/MF A01**
Utah Univ., Salt Lake City. Dept. of Geology and Geophysics.
Program Review: Resource Evaluation, Reservoir Confirmation, and Exploration Technology.
S. H. Ward. May 78, 192p
Contract EG-78-C-07-1701

The details of the program review are reported. A summary of the recommendations, means for their implementation, and a six year program of expenditures which would accomplish the objectives of the recommendations are presented. Included in appendices are the following: DOE/DGE consortia participants; program managers contacted for opinion; communications received from program

managers; participants, program review panel; and program strategy for resource evaluation and reservoir confirmation. (ERA citation 05:011722)

IDO-78-1701.b.3.2.3 PC **A06**/MF **A01**
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab.
Interactive DIPole-DIPole Resistivity and IP Modeling of Arbitrary Two-Dimensional Structures (IP2D Users Guide and Documentation).
T. J. Killpack, and G. W. Hohmann. Jan 79, 101p
Contract EG-78-C-07-1701

An interactive IP-resistivity modeling computer program has been developed. This program can be used to model arbitrary two-dimensional IP-resistivity structures for comparison with data from dipole-dipole surveys. The program computes the potential difference between the two potential electrodes of a conventional dipole-dipole array using a finite-element approach. Additional software has been written around the original program to provide interactive input and output functions. This report is a users guide and documentation for the interactive program called IP2D. (ERA citation 05:015508)

KFK-2563 PC **A09**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Lab. fuer isotopentechnik.
Mineral Concentration by Flotation. A Survey.
K. Wiese, J. Schmitz, and G. Wollmann. Jul 78, 180p
In German.
U.S. Sales Only.

The variables of the pulp, the influence of flotation reagents, and the phenomena of the mineralization of air bubbles are treated in some detail besides explanations of the disaggregation of minerals. The machines used in technical flotation processes are described and the possibilities of designing flotation cycles are indicated and explained by practical examples. Measuring techniques used to monitor important process parameters are reported and reference is made to radiometric techniques presently developed and used to a growing extent. Because of the increasing tendency of flotation system control, the application of radioactive tracers proves to be an important method of investigation for fundamental research required to describe mathematically the flotation process. The steps of automation leading to process optimization are indicated and flotation systems characterized by different degree of automation are presented. (Atomindex citation 10:421203)

METC/EGSP-100 PC **A05**/MF **A01**
New York State Museum, Albany.
Wells Penetrating Middle and Upper Devonian Black Shales in New York as of January 1978.
J. C. Peterson, and A. M. Van Tyne. 1979, 80p
Contract EY-76-S-05-5206

This document comprises two maps. (ERA citation 05:013082)

NE-PROJ-4560062-063 PC **A06**/MF **A01**
Viak AB, Vaellingby (Sweden).
Geothermal Energy in South-West Scania, Sweden: Drilling and Testpumping of Hoellviksnaes 1. Final Report.
G. Gustafson, and O. Andersson. Jul 79, 101p
In Swedish.
U.S. Sales Only.

The possibilities for geothermal exploitation of the sedimentary rock in southern Sweden are reported. At Hoellviksnaes an old oilbore-hole has been redrilled to about 2050 m depth. It is estimated that 3 MW thermal energy could be supplied from this well, at a water temperature of about 60 exp 0 C. The geothermal fluid had a salt content of 170 to 195 g/l. (ERA citation 05:015480)

NIM-1874 PC **A03**/MF **A01**
National Inst. for Metallurgy, Johannesburg (South Africa).
Activation Analysis and Classification to Source of Samples from the Kimberley Reef Conglomerates.
S. E. Rasmussen. 10 Mar 77, 40p
U.S. Sales Only.

Three boreholes were drilled in the west, central, and eastern sections of the Durban Roodepoort Deep Mine, and twelve distinct strata were intersected. Twenty-two samples from the three borehole cores were analysed in triplicate for twenty-six elements, and, including standards, a total of 2000 determinations were made. Statistical analysis of the results obtained for twenty-four elements shows a successful back-classification of 98 per cent, whereas, if the conglomerates or quartzites are treated separately, 100 per cent success is obtained. When the present data are used for classification of the samples from the three cores analysed during the first phase of this project, 100 per cent accuracy of classification is achieved by use of only ten selected elements. The objects of this investigation have therefore been met successfully, and extension to further strata and to sampling beyond the confines of the mine is justified. (Atomindex citation 10:423670)

NVO-1558-5(V.1) PC **A06**/MF **A01**
Gruy Federal, Inc., Houston, TX.
Atlantic Coastal Plain Geothermal Test Holes, North Carolina. Hole Completion Reports.
L. B. Cobb, L. Radford, and M. Glascock. Mar 79, 103p
Contract ET-78-C-08-1558

Intermittent drilling operations were carried out in North Carolina beginning October 10, 1978 and ending January 23, 1979. A total of eleven holes were completed during this period. Several holes including Sites 16-A, 15, 14 and 14-A were cased with 2-7/8" EUE tubing and left for reentry and subsequent coring operations by VPI and SU. The remainder of the North Carolina holes were cased with 4 1/2" seamless casing, wellhead equipment installed to permit geothermal test measurements, and left filled with water containing corrosion inhibitor. (ERA citation 05:015578)

ORNL/MIT-297 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Oak Ridge, TN. School of Chemical Engineering Practice.
Surface Properties of Texas Lignite Coal.
J. C. Metsa, R. P. Hart, and M. E. Mullins. Mar 80, 28p
Contract W-7405-ENG-26

The physicochemical structure of Texas lignite coal was characterized by examining N sub 2 , CO sub 2 , and H sub 2 O sorption and aqueous heats of immersion. BET surface areas developed from the isotherms were 1.12, 192.2, and 355.4 m exp 2 /g for N sub 2 , CO sub 2 , and H sub 2 O, respectively. Comparison indicated that Texas lignite behaved similarly to sub-bituminous Wyodak coal. Texas lignite char exhibited markedly different sorptions of N sub 2 and H sub 2 O, while CO sub 2 uptake in the char was nearly the same. Disparity in gas sorptions were attributed to elastic micropores and induced electronic effects. Heats of immersion of 108 J/g were found to be independent of outgassing temperature until plastic deformation of the coal structure occurred. (ERA citation 05:014707)

ORNL/TM-6752 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
County Coal Projections 1975-2000 Prepared for the National Coal Utilization Assessment.
D. J. Bjornstad, and D. N. Stuckwish. Jan 80, 87p
Contract W-7405-ENG-26

This paper describes the computational algorithm used by ORNL to project county coal production and employment levels for the NCUA, and the data and assumptions used to operate this algorithm. This system offers a highly simplified nonbehavioral method to obtain projections for small regions of the United States. The method tends to be highly sensitive to input assumptions regarding coal production levels at the higher regional level, because these levels are used as control totals for small area distributions. Moreover, as production increases the method tends to draw all eligible counties into production rapidly. Nonetheless, this approach does provide a useful way to investigate the credibility of scenarios that contain rapid expansions of the nation's coal extraction sector. The approach emphasizes the relatively remote locations of many reserve beds, while at the same time indicating the degree to which remote beds in many states must be exploited if scenario totals are to be met. As an example of the system's outputs, two projection series have been compared: one based on control totals from the SEAS-AEAR system and one based on ORNL calculations. Poor reserve data quality argues in favor of the simple approach this system employs. (ERA citation 05:013012)

PB80-169469 PC **A03**/MF **A01**
New Mexico Energy Inst., Socorro.
Coordinating Fossil Fuel Research in Natural Gas Recovery, Coal.
1979, 29p

This report reviews projects that range from studying the State's fossil fuel resources to developing new methods for expanded exploration, improving production techniques, and developing programs which best utilize these resources.

PB80-173891 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
A Suggested Experimental Plan for the Determination of the Accuracy and Reliability of Coal Mine Dust Measurements.
Final rept. 1 Feb 77-30 Jun 79,
Harry H. Ku, and Joan R. Rosenblatt. Oct 79, 48p BUMINES-OFR-45-80
Contract J0177013

The work in this study was done under an agreement with the National Bureau of Standards and the Bureau of Mines with the objective to determine the accuracy and reliability of dust measurements when taken with the current equipment by coal miners in underground mines. The work is to be conducted in two phases. The first is to develop an experimental plan to determine the accuracy and reliability of coal mine dust measurements at three levels of funding and will serve as a basis for the second phase in which the experimental work will be conducted.

PB80-174261 PC **A05**/MF **A01**
White Pine Copper Co., MI.
The Field Testing of Several Mine Roof Fall Alarm Systems in an Anticipated Natural Roof Fall in the White Pine Mined-Out Windpipe Area.
Final rept. 13 Jun 77-30 Jun 78,
Walter L. Finlay. 30 Jun 78, 96p BUMINES-OFR-50-80
Contract H0272036

The Bureau of Mines has developed prototype instruments promising to improve the ability to warn of imminent roof falls. An unusually good opportunity to test these comparatively under natural caving conditions was afforded by the forecasted caving in August 1977 of a mined-out region of the White Pine mine where the rock strata closely resembles those in many coal mines. The anticipated cave was of the competent roof-weak-pillar type and occurred as and when predicted. Automated convergence and bed separation gages agreed well with the standard manual convergence gage measurements. A microseismic gage was insensitive to the fall and may require different test conditions for effectiveness. A roof resistivity unit was tested under a separate Bureau of Mines contract. An unplanned addition to the field test, the tiltmeter, showed interesting potential.

PB80-176357 PC **A07**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Evaluation of Chemical Agents for Inhibiting Acid Mine Drainage Formation.
Final rept.,
John W. Nebgen, and Douglas F. Weatherman. Apr 79, 128p BUMINES-OFR-49-80
Grant J0366036

This report contains findings from a Bureau of Mines study concerning the inhibition of acid mine drainage formation from underground coal mines. A series of experiments was performed in which three different pyritic materials (wastes from coal production plants) were evaluated using several candidate inhibiting agents. Data obtained from the inhibitor-treated pyrites were compared with data from control experiments in which untreated pyritic wastes were used. The experiments were conducted by placing treated and untreated pyrite in columns, passing moist air through the columns to promote oxidation of pyrite, and washing the columns weekly to collect oxidation products for

analysis. The results indicate that quantities of acid mine drainage can be substantially reduced if soluble iron III (ferric) ion is controlled.

PB80-810351 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Oil Shale Mining, Processing, Uses, and Environmental Impacts. 1978-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Apr 80,
Audrey S. Hundemann. May 80, 213p
Supersedes NTIS/PS-79/0510 and NTIS/PS-78/0423. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-77/0386 and PB80-810369. See also 1964-1975, NTIS/PS-77/0384 and 1976-1977, NTIS/PS-79/0509.

Government-funded research on exploration, mining, retorting, chemistry, environmental impacts, and policies relating to oil shale research is covered. Abstracts discuss such things as oil shale air and water pollution control, production of synthetic fuels, use of spent oil shale in road construction, identification of research and development priorities, and in situ recovery of shale oil. (This updated bibliography contains 206 abstracts, 95 of which are new entries to the previous edition.)

PB80-810369 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Oil Shale Mining, Processing, Uses and Environmental Impacts. 1978-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1978-Apr 80,
Audrey S. Hundemann. May 80, 185p
Supersedes NTIS/PS-79/0512 and NTIS/PS-78/0424. For the companion Published Searches of the NTIS Data Base, see NTIS/PS-77/0384, NTIS/PS-79/0509, and PB80-810351. See also 1970-1975, NTIS/PS-77/0386 and 1976-1977, NTIS/PS-79/0511.

Worldwide research on exploration, mining, retorting, chemistry, thermal studies, environmental impacts, and policies relating to oil shale research is discussed. A few abstracts deal with the production of synthetic fuels from shale oil and the economics of oil shale operations. (This updated bibliography contains 178 abstracts, 65 of which are new entries to the previous edition.)

PNL-3183 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Coarse Coal Hydrotransport Data Predictions.
N. J. Lombardo, and L. L. Eyler. Jan 80, 48p
Contract EY-76-C-06-1830

This report describes an independent evaluation of the hydrodynamic data obtained with coarse coal in 3- and 6-in. recirculation loops. The measured data are compared with several recently published predictive methods to evaluate data quality and determine data trends. A limited parameterization of these models to investigate their sensitivity is also presented. In recirculating loop tests, velocity ranges of 2 through 15 ft/sec were used to pump solid concentrations of up to 45% by weight. Pressure drop data were obtained for particle-to-pipe diameter ranges to 0.25 under various flow conditions. The predictive methods used to analyze the hydrodynamic data obtained include mechanistic models and empirical correlations. For each method, predicted versus measured headloss gradients were plotted to evaluate the ability of each method to reproduce the parameter trends exhibited by the pressure drop data. Of the five methods selected for analyzing the data, three could be used to predict the head loss gradients with some certainty, including a sliding bed model that provided predicted results equal to a regression analysis of the original data. The original correlation of the data was found to be capable of reproducing 90% of the measured results to within +-30%. It was therefore concluded that the original correlation and the sliding bed model provided sufficient accuracy to be used as a means for estimating the headloss for coarse particle coal systems in 3- and 6-in. lines. The success of the predictive methods in reproducing the parameter trends indicate that the data obtained were reasonably accurate and reliable. It is is expected that mechanistic models can become a valuable design tool for predicting hydrotransport performance over ranges of parameters. (ERA citation 05:013026)

PNL-3203 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Hydrotransport Plugging Study. FY-1979 Progress Report.
L. L. Eyler, and N. J. Lombardo. Jan 80, 116p
Contract EY-76-C-06-1830

The objective of the Hydrotransport Plugging Study is to investigate phenomena associated with predicting the onset and occurrence of plugging in pipeline transport of coal. This study addresses large particle transport plugging phenomena that may be encountered in run-of-mine operations. The project is being conducted in four tasks: review and analysis of current capabilities and available data, analytical modeling, experimental investigations, and unplugging and static start-up. This report documents work completed in FY-1979 as well as work currently in progress. A review of currently available prediction methods was completed. Applicability of the methods to large particle hydrotransport and the prediction of plugging was evaluated. It was determined that available models were inadequate, either because they are empirical and tuned to a given solid or because they are simplified analytical models incapable of accounting for a wide range of parameters. Complicated regression curve fit models lacking a physical basis cannot be extrapolated with confidence. Several specific conclusions were reached: Recent developments in mechanistic modeling, describing flow conditions at the limit of stationary deposition, provide the best basis for prediction and extrapolation of large particle flow. Certain modeled phenomena require further analytical and experimental investigation to improve confidence levels. Experimental work needs to be performed to support modeling and to provide an adequate data base for comparison purposes. No available model permits treatment of solids mixtures such as coal and rock. (ERA citation 05:014747)

SAN-0389-T1 PC **A03**/MF **A01**
Geothermal Resources Council, Davis, CA.
Industry Survey of the Need for a Federal Grant-Assisted Geothermal Demonstration Power Plant. Final Report.
Jun 78, 37p
Contract EW-78-X-03-0389

Findings are presented from two separate studies: a preliminary study of leaders of the geothermal industry and a second study of a ten percent representative sample of other firms. The studies are intended to determine if a need still exists for a federal grant-assisted geothermal demonstration power plant. The following are included: selection of the survey samples from the population comprising the geothermal industry; the development of the survey instrument; the collection and analysis of the results; and a summary. The responses of financial firms are discussed. (ERA citation 05:011764)

SAN-1189-3-T1 PC **A03**/MF **A01**
Cities Service Co., Jackson, MS.
Bodcau IN Situ Combustion Project: Ignition. Topical Report of May 1977.
C. Joseph. Feb 80, 40p
Contract EY-76-C-03-1189

The five patterns of the Bodcau In Situ Combustion Project were successfully ignited between August 7 and September 24, 1976. Electric heaters were used to ignite the formation. Cities Service Company personnel operated the equipment and monitored the process to ignition confirmation. Operational problems encountered were handled in an expeditious manner enabling operations to continue without appreciable delays. (ERA citation 05:014769)

SAN-1189-4 PC **A07**/MF **A01**
Cities Service Co., Tulsa, OK.
Bodcau IN Situ Combustion Project Pressure Transient Testing. Topical Report of January 1978.
P. Bandyopadhyay, and C. Joseph. Feb 80, 126p
Contract EY-76-C-03-1189

The objectives of the falloff tests conducted prior to ignition in August and September 1976 and again in February 1977, were to determine the injection wellbore conditions and pattern flow capacities and to determine how or if the burning process affects them. Pulse tests were conducted to determine directional permeabilities within patterns in order to assist in predicting the combustion front movement. The tests were conducted by shutting off injection into the central injector and subsequently monitoring the tubinghead pressure at that injector, as well as the gas production rates at the offset producing wells. Injection was then restarted and the offset wells' gas production monitored until it was near the initial rate. Analysis of the falloff tests indicates that the advance of the firefront results in large increases in the formation flow capacity and average permeability around the injection wells. Pulse tests analysis, on the other hand, is not so simply understood. The dip of the formation is responsible for generally higher gas mobility (low lag times) toward the south. However, notable deviation occurs in certain patterns due to local anomalies in rock character, saturations and even possibly dip. The lag time measurements on each well defines its particular degree of connectedness to the offset injector. These lag times should be directly connected to the time required for breakthrough of the firefront at that well.While local variations in reservoir properties must be considered in looking at the behavior of a particular well, the overall average behavior should be considered when selecting pattern configuration. The generally increased gas flow toward the south, previously mentioned, indicates that elongation of the patterns toward the south was indeed justified even though some premature breakthrough toward the north will occur due to local variations in geology. (ERA citation 05:014770)

SAN-1864-1 PC **A17**/MF **A01**
Science Applications, Inc., La Jolla, CA.
California Thermal Oil Utilization. Volume I. Executive Summary. Final Report.
R. Colman, and E. W. Standley. Dec 79, 385p
Contract ET-78-C-03-1864

The potential for significant increases in California thermally produced crude oil (CTO) production and utilization by 1985 was studied. The DOE goal of 900,000 barrels/day of total CTO production by 1985 was evaluated. The constraints to increased CTO production were discussed. Incentives for increasing production were recommended. Physical and chemical properties, conventional refining processes, and alternate technologies for CTO were also discussed. (ERA citation 05:013058)

SAN-2121-1 PC **A04**/MF **A01**
JM Energy Consultants, Inc., Los Angeles, CA.
Financing Geothermal Resource Development in the Pacific Region States.
15 Aug 78, 55p
Contract ET-78-C-03-2121

State and federal tax treatment as an incentive to development and non-tax financial incentives such as: the federal geothermal loan guarantee program, the federal geothermal reservoir insurance, and state financial incentives are discussed. (ERA citation 05:013412)

SAN-2121-2 PC **A04**/MF **A01**
JM Energy Consultants, Inc., Los Angeles, CA.
State Agency Geothermal Coordination in California.
30 Nov 78, 53p
Contract ET-78-C-03-2121

The performance of the State Geothermal Resources Board (GRB) is presented. The State Geothermal Resources Task Force of 1977 and its influence on the present setting are studied. The GRB's Technical Advisory Committee and the agencies' use of it during the current year as a focal point of their geothermal policy efforts are explored. Also explored is the possibility of California's forming a more formal mechanism for carrying out that concern. (ERA citation 05:013413)

SAN-2121-4 PC **A03**/MF **A01**
JM Energy Consultants, Inc., Los Angeles, CA.
Legal and Institutional Problems Facing Geothermal Development in Alaska.
1 Oct 78, 47p
Contract ET-78-C-03-2121

The major players and the major difficulties each presents to geothermal development in Alaska are sketched. The following are included: the Alaskan natives, the posture of the state of Alaska, and the federal lands. (ERA citation 05:013415)

SAN-2121-6 PC **A03/MF A01**
JM Energy Consultants, Inc., Los Angeles, CA.
Legal and Institutional Problems Facing Geothermal Development in Hawaii.
1 Oct 78, 34p
Contract ET-78-C-03-2121

The problems discussed confronting future geothermal development in Hawaii include: a seemingly insoluble mismatch of resource and market; the burgeoning land claims of the Native Hawaiian community; a potential legal challenge to the State's claim to hegemony over all of Hawaii's geothermal resources, regardless of surface ownership; resistance to any sudden, large scale influx of Mainland industry, and questionable economics for the largest potential industrial users. (ERA citation 05:013416)

SAN-2121-7 PC **A03/MF A01**
JM Energy Consultants, Inc., Los Angeles, CA.
Legal and Institutional Problems Facing Geothermal Development in Oregon and Washington.
1 Oct 78, 36p
Contract ET-78-C-03-2121

The energy supply and demand picture of these two states is sketched. The perceived legal and institutional problems facing geothermal are shown against the backdrop of this broader, energy policy portrait. The following are discussed: the Bonneville Power Administration - regional power broker; other key institutional players; industrial users, public utilities, two state governments, and one regional commission; and a legal/institutional agenda for the Pacific Region team. (ERA citation 05:013417)

SAND-79-1905C PC **A02/MF A01**
Sandia Labs., Albuquerque, NM.
Federal Program in Geothermal Drilling and Completion Research and Development.
S. G. Varnado. 1979, 19p CONF-800204-2
Contract EY-76-C-04-0789
Energy-sources technology conference, New Orleans, LA, USA, 3 Feb 1980.

The high cost of drilling and completing geothermal wells is an impediment to the development of this resource. The Department of Energy (DOE), Division of Geothermal Energy (DGE), is conducting an R and D program directed at reducing well costs through improvements in geothermal drilling and completion technology. This program includes R and D activities in high temperature drilling hardware, drilling fluids, lost circulation control methods, completion technology, and advanced drilling systems. Sandia Laboratories manages this program for DGE. This paper presents an overview of the program. (ERA citation 05:011776)

SAND-79-2036 PC **A03/MF A01**
Sandia Labs., Albuquerque, NM.
Aqueous Foam Surfactants for Geothermal Drilling Fluids: 1. Screening.
P. B. Rand. Jan 80, 41p
Contract EY-76-C-04-0789

Aqueous foam is a promising drilling fluid for geothermal wells because it will minimize damage to the producing formation and would eliminate the erosion problems of air drilling. Successful use of aqueous foam will require a high foaming surfactant which will: (1) be chemically stable in the harsh thermal and chemical environment, and (2) form stable foams at high temperatures and pressures. The procedures developed to generate and test aqueous foams and the effects of a 260 exp 0 C temperature cycle on aqueous surfactant solutions are presented. More than fifty selected surfactants were evaluated with representatives from the amphoteric, anionic, cationic, and nonionic classes included. Most surfactants were severely degraded by this temperature cycle; however, some showed excellent retention of their properties. The most promising surfactant types were the alkyl and alkyl aryl sulfonates and the ethoxylated nonionics. (ERA citation 05:015581)

SAND-79-7116 PC **A06/MF A01**
Enertech Engineering and Research Co., Houston, TX.
Wellbore and Soil Thermal Simulation for Geothermal Wells: Comparison of Geotemp Predictions to Field Data and Evaluation of Flow Variables. Part II Report.
G. R. Wooley. Jan 80, 111p
Contract EY-76-C-04-0789

A better understanding of temperatures in a well is needed to improve casing selection, cement design, drilling fluid formulation, packer selection, and many other aspects of well design. Two applications of GEOTEMP are presented which provide the calculations needed. First, the results of testing GEOTEMP predictions with analytical solutions and with field temperature data are presented. And second, sensitivity studies establish the importance of certain well variables on downhole temperatures. (ERA citation 05:015595)

SAND-79-7119 PC **A04/MF A01**
Enertech Engineering and Research Co., Houston, TX.
Wellbore and Soil Thermal Simulation for Geothermal Wells: Development of Computer Model and Acquisition of Field Temperature Data. Part I Report.
G. R. Wooley. Mar 80, 75p
Contract EY-76-C-04-0789

A downhole thermal simulator has been developed to improve understanding of the high downhole temperatures that affect many design factors in geothermal wells. This development is documented and field temperature data presented for flowing and shut-in conditions. (ERA citation 05:015533)

SAND-79-7127 PC **A03/MF A01**
Completion Technology Co., Houston, TX.
Performance Evaluation of Magma Power Company's Reinjection Well No. 46-7 at the East Mesa KGRA, California.
R. M. Jorda. Feb 80, 35p
Contract EY-76-C-04-0789

The performance of the Magma Power Company's reinjection well No. 46-7 at East Mesa has been examined. Water was cooled to 100 exp 0 F(+-) to simulate total heat extraction and then tested using membrane filter flow procedures. The cooled water contains particles which are in the high colloid size range, and formation impairment by these particles is unlikely. There is evidence that acid soluble corrosion products and calcium compounds constitute about two thirds of the particulates, and that the acid insoluble residue contains precipitated silica, insoluble corrosion products, and possibly formation fines carried in the produced water. Under stabilized conditions, the suspended solids content of the water is less than 2 parts per million. However, during the frequent production well start ups, a higher concentration of suspended solids is carried in the produced water and into the injection well, conceivably augmenting fill in the injector. But most likely, fill occurs when the injection well surges during shut-downs, because of inadequate sand control in the well completion. At the time of the test, the injection well was found to be severely impaired. Back flowing the well restored the injectivity to a calculated maximum sub-frac injection capacity of about 60,000 b/d of water at T = 350 exp 0 F, which corresponds to a calculated maximum hypofrac injection capacity of about 20,000 b/d of cold water (T = 100 exp 0 F). (ERA citation 05:015596)

SAND-80-0278C PC **A02/MF A01**
Sandia Labs., Albuquerque, NM.
Recovery of Heavy Oils from Deep Reservoirs.
H. M. Stoller, and R. L. Fox. 1980, 21p CONF-800204-7
Contract EY-76-C-04-0789
Energy-sources technology conference, New Orleans, LA, USA, 3 Feb 1980.

The objective of Project DEEP STEAM is to develop the technology required to economically produce heavy oil from deep reservoirs. Two approaches are being pursued: improving the thermal efficiency of injection string components and the development of downhole steam generators to achieve steam injection. The first approach has seen the testing of commercially available components at a high temperature (650 exp 0 F)/high pressure (2100 psi) simulation facility. Promising components will be tested shortly in a field test conducted by Husky Oil at Lloydminster, Canada. The second approach has seen the prototype development and laboratory testing of low-pressure and high-pressure hydrocarbon-fueled downhole steam generators. Concurrently, a modified high pressure steam generator has undergone extensive laboratory combustion studies and is currently being employed in a field test at Chevron's Kern River field. This field test is examining the effects of simultaneous injection of steam and combustion products on the reservoir and oil recovery. 9 figures. (ERA citation 05:014772)

SAND-80-0309C PC **A02/MF A01**
Sandia Labs., Albuquerque, NM.
Magma Energy: A Feasible Alternative.
J. L. Colp. 1979, 21p CONF-791216-2
Contract EY-76-C-04-0789
Conference on long-term energy resources, Montreal, Canada, 3 Dec 1979.

A program to investigate the scientific feasibility of extracting energy directly from deeply buried circulating magma sources is described. The following program tasks are discussed: source location and definition, source tapping, magma characterization, magma/material compatibility, and energy extraction. (ERA citation 05:015499)

SERI/TR-352-392 PC **A06/MF A01**
Solar Energy Research Inst., Golden, CO.
Solar Technology Application to Enhanced Oil Recovery.
P. de Leon, K. C. Brown, J. W. Margolis, and L. H. Nasr. Dec 79, 101p
Contract EG-77-C-01-4042

One proposed near-term commercial application for solar energy technology is the use of solar energy systems to generate steam for thermal enhanced oil recovery (EOR). This report examines four aspects of solar energy employed for steam EOR. First, six solar technologies are evaluated and two - parabolic troughs and central receivers - are selected for closer study; typical systems that would meet current production requirements are proposed and costed. Second, the legal and environmental issues attending solar EOR are analyzed. Third, the petroleum producing companies' preferences and requirements are discussed. Finally, alternative means of financing solar EOR are addressed. The study concludes that within the next four to five years, conventional (fossil-fueled) thermal EOR means are much less expensive and more available than solar EOR systems, even given environmental requirements. Within 10 to 15 years, assuming specified advances in solar technologies, central receiver EOR systems will be significantly more cost-effective than parabolic trough EOR systems and will be price competitive with conventional thermal EOR systems. Important uncertainties remain (both in solar energy technologies and in how they affect the operating characteristics of petroleum reservoirs) that need resolution before definitive projections can be made. (ERA citation 05:013059)

8J. Physical Oceanography

AD-A083 065/3 Not available NTIS
Royal Roads Military Coll Victoria (British Columbia)
On Planetary Voltages, Ocean Tides, and Electrical Conductivity Below the Pacific,
H. J. Duffus, and N. R. Fowler. 11 Sep 73, 21p
DRB-REPRINT-4031
Abstract in French.
Availability: Pub. in Canadian Jnl. of Earth Sciences, v11 n7 p873-892 Jul 74 (No copies furnished by DTIC).

No abstract available.

AD-A083 111/5 Not available NTIS
Washington Univ Seattle Dept of Atmospheric Sciences
The Aqueous Thermal Boundary Layer,
Kristina B. Katsaros. 3 Jan 79, 21p Rept no. CONTRIB-354

Contract N00014-75-C-0502
Availability: Pub. in Boundary-Layer Meteorology, v18 p107-127 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 147/9 PC **A02/MF A01**
Woods Hole Oceanographic Institution MA
A Moored Instrument for Vertical Temperature Gradients,
Jerome P. Dean. 14 Feb 79, 9p Rept nos. WHOI-79-83, WHOI-CONTRIB-3828
Contracts N00014-76-C-0197, N00014-74-C-0262
Pub. in Jnl. of Geophysical Research, v84 nC8 p5089-5091, 20 Aug 78.

No abstract available.

AD-A083 152/9 PC **A02/MF A01**
Louisiana State Univ Baton Rouge Coastal Studies Inst
Evolution of Sand-Dominant Subaerial Phase, Atchafalaya Delta, Louisiana,
H. H. Roberts, R. D. Adams, and R. H. W. Cunningham. 8 May 78, 19p Rept no. TR-299
Contract DACW29-77-C-0163
Pub. in the American Association of Petroleum Geologists Bulletin, v64 n2 p264-279 Feb 80.

No abstract available.

AD-A083 402/8 PC **A02/MF A01**
Woods Hole Oceanographic Institution MA
Shallow Structure and Sedimentation in the Southeastern Mediterranean Sea.
Technical rept.,
David A. Ross, and Elazar Uchupi. 15 Dec 79, 23p Rept nos. WHOI-79-95, WHOI-CONTRIB-4286
Contract N00014-74-C-0262, Grant NSF-DES74-13212
Pub. in Sedimentary Geology, v23 p1-18 1979. Sponsored in part by Grant NSF-OIP75-02516.

No abstract available.

AD-A083 404/4 PC **A03/MF A01**
Woods Hole Oceanographic Institution MA
Late Cenozoic Sedimentation and Erosion on the Rio Grande Rise.
Technical rept.,
David A. Johnson, and Christopher S. Peters. Dec 79, 27p Rept nos. WHOI-79-97, WHOI-CONTRIB-4222
Contract N00014-74-C-0262, Grant NSF-OCE74-01744
Pub. in Jnl. of Geology, v87 p371-392 1979.

No abstract available.

AD-A083 405/1 PC **A02/MF A01**
Woods Hole Oceanographic Institution MA Dept of Geology and Geophysics
An Ocean Bottom Hydrophone Instrument for Seismic Refraction Experiments in the Deep Ocean.
Technical rept.,
Donald E. Koelsch, and G. M. Purdy. Dec 79, 17p Rept nos. WHOI-79-93, WHOI-CONTRIB-4174
Contract N00014-74-C-0262
Pub. in Marine Geophysical Researches, v4 p115-125 1979.

No abstract available.

AD-A083 438/2 Not available NTIS
American Geophysical Union Washington DC
Deep Drilling Results in the Atlantic Ocean: Ocean Crust,
Manik Talwani, Christopher G. Harrison, and Dennis E. Hayes. 1979, 443p Rept no. SCIENTIFIC-48
Original contains color plates: All reproductions will be in black and white. Presented at the Maurice Ewing Symposium (2nd) Held in New York on 19-25 Mar 78, Maurice Ewing Series 2. See also AD-A083 439.
Availability: American Geophysical Union, 2000 Florida Ave., N.W., Washington, DC 20009, Library of Congress Catalog Card No. 79-88753 HC $18.00 (No copies furnished by DTIC).

The second Maurice Ewing Symposium was devoted to the implications of deep drilling results in the Atlantic Ocean. This subject was chosen for two reasons. First, Maurice Ewing was one of the leaders of JOIDES (Joint Oceanographic Institutions for Deep Earth Sampling), the association of oceanographic institutions that was formed to organize and sponsor drilling in the deep ocean, and which has continued to provide scientific advice to the Deep Sea Drilling Project. Second, the first phase of International Program of Ocean Drilling in the Atlantic was finished and it seemed a good time to assess the implications of drilling results in the Atlantic that had been obtained over almost a decade. During the time this volume was being prepared, discussions were taking place about a new initiative in oceanic drilling, in which a drilling vessel with much enhanced capability might be used. The results presented in this volume thus represent the base on which new drilling plans can be built.

AD-A083 439/0 Not available NTIS
American Geophysical Union Washington DC
Deep Drilling Results in the Atlantic Ocean: Continental Margins and Paleoenvironment,
Manik Talwani, William Hay, and William B. F. Ryan. 1979, 444p
Presented at the Maurice Ewing Symposium (2nd) Held in New York on 19-25 Mar 78, Maurice Ewing Series 3. See also AD-A083 438.
Availability: American Geophysical Union, 2000 Florida Ave., N.W., Washington, DC 20009 Library of Congress Catalog Card No. 79-88753, HC $18.00 (No copies furnished by DTIC).

The second Maurice Ewing Symposium was devoted to the implications of deep drilling results in the Atlantic Ocean. This subject was chosen for two reasons. First, Maurice Ewing was one of the leaders of JOIDES (Joint Oceanographic Institutions for Deep Earth Sampling) the association of oceanographic institutions that was formed to organize and sponsor drilling in the deep ocean, and which has continued to provide scientific advice to the Deep Sea Drilling Project. Second, the first phase of International Program of Ocean Drilling in the Atlantic was finished and it seemed a good time to assess the implications of drilling results in the Atlantic that had been obtained over almost a decade. During the time this volume was being prepared, discussions were taking place about a new initiative in oceanic drilling, in which a drilling vessel with much enhanced capability might be used. The results presented in this volume thus represent the base on which new drilling plans can be built.

AD-A083 621/3 PC **A03/MF A01**
Lamont-Doherty Geological Observatory Palisades NY
Acoustic Characteristics of the Shelves between Alaska and U.S.S.R.
Technical rept. May-Oct 79,
Robert E. Houtz. Oct 79, 29p Rept no. LDGO-CU-2-79
Contract N00014-75-C-1126

Sound velocity characteristics at the seafloor and down to depths of 9-10 km have been generalized from 554 sonobuoy solutions in the Chukchi and Beaufort Seas. Sediment isopachs, contoured seafloor sound velocities, general geology, and velocity-depth functions appear in a set of regional charts. (Author)

PB80-181522 PC **A99/MF A01**
Texas Univ. at Austin, Port Aransas. Port Aransas Marine Lab.
Environmental Studies, South Texas Outer Continental Shelf, 1975-1977. Volume III. Study Area Final Reports,
R. Warren Flint, and Nancy N. Rabalais. Jan 80, 650p BLM/YM/ES-80/6
Contract DI-AA551-CT8-51
See also Volume 2, PB80-181514.
Also available in set of 3 reports PC E19, PB80-181498.

This study of the South Texas Outer Continental Shelf (STOCS) was conducted on behalf of the Bureau of Land Management and with the close cooperation of personnel of that agency. The results reported on herein constituted a synthesis of three years of an environmental studies program of the STOCS. This study was part of an overall program that included the other elements of (1) geology and geophysics by the U.S. Geological Survey, (2) fisheries resources and ichthyoplankton populations by the National Oceanic and Atmospheric Administration/National Marine Fisheries Service, and (3) biological and chemical characteristics of selected topographic features in the northern Gulf of Mexico by Texas A and M University.

PB80-181563 PC **A99/MF A01**
Science Applications, Inc., Raleigh, NC.
South Atlantic OCS Physical Oceanography. Volume III.
Final rept.
Mar 80, 638p BLM/YM/ES-80/3
Contract DI-AA550-CT7-29
See also Volume 2, PB80-181555.Color illustrations reproduced in black and white.
Also available in set of 3 reports PC E19, PB80-181530.

This final progress report represents the results of the first year of a four year physical oceanographic and meteorological data collection effort on the Outer Continental Shelf (OCS) from Cape Hatteras, North Carolina to Cape Canaveral, Florida, during the period of September 1977 through November 1978. The report is to be used to provide an understanding of the currents, circulation and mixing processes in the Georgia Embayment/South Atlantic Bight (SAB) to assess the effects of OCS oil and gas activities on the biological environment, as well as on recreational and commercial fishing.

PB80-182322 PC **A02/MF A01**
Rhode Island Univ., Narragansett. Sea Grant Program.
A Report on the University of Rhode Island Sea Grant Program, July 1978 to June 1979.
Annual rept.,
Elisabeth Keiffer. Feb 80, 22p URI-MM-63, NOAA-80033102
See also PB-295 534.

This annual report provides summaries of the Sea Grant program of the University of Rhode Island during the 1979 fiscal year. Summaries are given on: Marine Advisory and Technical Assistance, Education, Research, Program Development, Project Status Fiscal Year 1979, Activity Budget, and Sea Grant Publications and Papers, July 1978 - June 1979.

PB80-184484 PC **A06/MF A01**
Washington Univ., Seattle. Dept. of Oceanography.
A Seasonal and Spatial Summary of Oceanographic Data from the Northeastern Tropical Pacific (DOMES Region), Summer 1975 and Winter 1976.
Special rept.,
M. D. Ohman, E. Ozturgut, and R. J. Ozretich. Sep 79, 125p REF-M79-53, SR-91, NOAA-80042301
Contract NOAA-03-6-022-35101

Upper water column data are presented from two series of cruises to the northeastern tropical Pacific conducted as part of the DOMES (Deep Ocean Mining Environmental Study) project in August-October 1975 and February-March 1976. The data selected include hydrographic data, dissolved chemical constituents, biochemical parameters, phytoplankton pigments and primary production rates, and suspended particulate concentrations. Tabular summaries and histograms of data values are presented for four depth zones--the surface mixed layer, the pycnocline, bottom of the pycnocline to 400 m, and 400-1000 m. Statistically detectable spatial heterogeneity exists across the DOMES region, although the variables which best indicate this heterogeneity are different above and below the pycnocline. To a lesser extent, seasonal differences are also detected.

8K. Seismology

AD-A083 626/2 PC **A03/MF A01**
Del Mar Technical Associates CA
Body Wave Inversion Using Travel Time and Amplitude Data.
Final rept.,

Andrejs Jurkevics, Ralphe Wiggins, and Luis Canales. 23 Jan 80, 43p Rept no. DELTA-R-79-0030
Contract N00014-78-C-0061

An interpretation scheme has been developed for the determination of laterally homogeneous earth structure using body-wave travel time and amplitude data. A family of p(x) (ray parameter vs distance) functions consistent with the data are obtained as solutions to an inverse problem. Each p(x) solution has a corresponding velocity-depth function which maximizes or minimizes the depth for one velocity. The family of allowable p(x) curves therefore defines a velocity-depth envelope which bounds the range of earth structures consistent with these data. (Author)

COO-2482-13 PC **A04**/MF **A01**
Denver Univ., CO.
Direct Methods for Seismic Profiling. Final Report.
N. Bleistein, J. K. Cohen, and F. G. Hagin. 12 Dec 79, 58p
Contract EY-76-S-02-2482

A coordinated research program in inverse problems was concluded. The program evolved from formulation to analytical solution to implemented computer algorithms. There were two main lines of research in this program: a velocity inversion method, with application to seismic exploration, and a physical optics inverse scattering method for reflector mapping, with application to nondestructive evaluation. In each case, computer algorithms based on the theoretical results were tested on real or testbed data from the area of the cited application. Research goals of both a theoretical and practical nature were achieved. 34 figures. (ERA citation 05:016945)

NUREG/CR-1423-V-1 PC **A09**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Structural Building Response Review: Seismic Safety Margins Research Program. Volume I.
Technical rept.,
John J. Healey, Spencer T. Wu, and Mikel Murga. May 80, 189p
Prepared in cooperation with Ebasco Services, Inc., New York.

The body of this report is organized in six chapters: Chapter 2 treats the subject of structural modeling including methods of discretization, basic modeling approaches, decoupling and other important modeling topics; Chapter 3 covers the various methods of linear and nonlinear structural dynamic analysis, numerical methods, damping, etc; Chapter 4 contains a discussion of the nonlinearity as it relates to nuclear plant structures and presents a discussion of basic analytical considerations and computational algorithms for treating nonlinearity; Chapter 5 treats the subject of combining seismic and nonseismic load effects with particular reference to the state-of-the-art in this area as related to the probabilistic methodology. This material was not fully elaborated on in this report since the SSMRP has a special project to address this topic; Chapter 6 presents a summary of the various sources of uncertainty in seismic dynamic analysis together with a discussion of the sources of data available to quantitatively define these uncertainties; Chapter 7 provides a summary of the principal observations and recommendations of the study.

PB80-170368 PC **A15**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Earthquake Risk and Damage Functions: An Integrated Preparedness and Planning Model Applied to New Madrid.
Final rept.,
Ben-Chieh Liu, Chang-Tseh Hsieh, Robert Gustafson, Otto Nuttli, and Richard Gentile. 7 Dec 79, 335p NSF/RA-790428
Grant NSF-ENV77-15669

This study attempts to provide, in an integrated analytical framework, the methodology and the data needed to guide public and private planning and future decision making for earthquake hazard preparedness and risk mitigation. The focus is on the New Madrid Fault region, especially the effect on the St. Louis and Memphis Standard Metropolitan Statistical Areas. An interdependent planning simulation model was developed to tie together statistically the seismic risk or physical damage functions to economic damage functions for potential earthquake risk assessment and impact evaluation for the next 50 years. Several topics are covered: (1) Various seismological risks in the New Madrid region are described and predicted; (2) The surficial materials are documented and ground susceptibility for the region is classified; (3) Populations subject to earthquake risk and the projected populations, 1980 through 2030, are discussed; (4) The development of the physical and economic damage functions and their applications to damage estimation and impact assessment under the 'status quo' scenario are presented; and (5) The institutional aspects and policy issues concerning earthquake risk reduction and preparedness are shown.

8M. Soil Mechanics

AD-A083 330/1 PC **A04**/MF **A01**
Lockheed Missiles and Space Co Inc Palo Alto CA Palo Alto Research Lab
Doubly-Asymptotic, Boundary-Element Analysis of Nonlinear Soil-Structure Interaction.
Final rept. 14 Nov 77-30 Jun 79,
P. G. Underwood, and T. L. Geers. 30 Jun 79, 69p LMSC/D673964, DNA-4953F, AD-E300 725
Contract DNA001-78-C-0026

This report describes a doubly-asymptotic (DA), boundary-element (BE) treatment of a surrounding nonlinear soil medium for dynamic soil-structure interaction analysis. Linear soil-structure interaction is reduced to a surface relationship that is asymptotically exact at both high and low frequencies. Nonlinear soil-structure interaction is treated similarly, except a volume contribution is added in the volume; a quasi-static and quasi-dynamic (axisymmetric) problem for which finite-element solutions have been obtained for comparison. For soil behavior based on J sub 2-plasticity theory, reasonable agreement is obtained. For soil behavior based on the Cap model, which is a combined I sub 1- and J sub 2-plasticity theory agreement is not obtained.

LA-8239-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Conceptual Design for a Subsidence Simulator.
J. V. Repa, J. W. McMullen, and P. D. Smith. Feb 80, 7p
Contract W-7405-ENG-36

A facility for determining the effects of soil surface strains on full-scale test structures is described. Soil strains may be those resulting from surface subsidence caused by collapse of underground mines or similar phenomena. The facility will provide data for use in designing subsidence-resistant structures. (ERA citation 05:016341)

PB80-175136 PC **A03**/MF **A01**
Technicolor Graphic Services, Inc., Sioux Falls, SD.
A Selected Bibliography of Remote Sensing Applications to Soil Science,
Thomas R. Loveland, Daniel B. Carter, and William C. Draeger. 1979, 32p
Contract DI-14-08-0001-16439

The bibliography contains approximately 200 references dealing with the application of remote sensing technology to the identification and analysis of soils. The scientific papers and reports listed describe procedures and methods used in data collection and include specific applications of those data to soil studies. Most citations discuss current work from 1970 to 1978 and all references are categorized according to the type of remotely sensed data used and their application.

PB80-175342 PC **A02**/MF **A01**
North Dakota Water Resources Research Inst., Fargo.
Soil-Water Retention, Transmission, and Quality of Leachate from Polymer-Treated Soils, Effects of the In Situ Crosslinking.
Technical completion rept. Oct 77-Sep 79,
J. L. Richardson, S. P. Pappas, E. J. Deibert, and Z. W. Wicks, Jr. Oct 79, 15p W80-04609, OWRT-A-059-NDAK(1)
Contract DI-14-34-0001-8036
Prepared in cooperation with North Dakota State Univ., Fargo., and North Dakota Univ., Grand Forks.

Clay, silt loam, and fine sandy loam were treated with various two-phase crosslinkable polymer systems and with polyvinyl alcohol (PVA) to study their effects on selected soil characteristics. Surface samples of the three soil types were taken in North Dakota and were analyzed for primary particle size distribution, natural water stable aggregate size distribution, percent organic carbon, and percent calcium carbonate equivalent. Samples were then treated with a variety of types and concentrations of amines and aldehydes of the two-phase crosslinkable polymer system. Some samples were treated with PVA and water to compare treatment effectiveness and to serve as a control. Following treatment four basic tests to determine the quality of soil aggregates on natural soils were performed: (1) plant available water holding capacity; (2) saturated hydraulic conductivity; (3) water stable aggregate size distribution; and (4) water drop penetration tests to measure water repellency.

PB80-175367 PC **A03**/MF **A01**
North Dakota Water Resources Research Inst., Fargo.
Physical Properties of Soil Moisture.
Technical completion rept. Jul 76-Sep 79,
James W. Harrell, Jr., and Francis L. Howell. Dec 79, 38p W80-04606, OWRT-A-051-NDAK(3)
Contract DI-14-34-0001-8036
Prepared in cooperation with North Dakota State Univ., Fargo., and North Dakota Univ., Grand Forks.

Proton NMR and diffusion coefficient measurements were used to study the mobility of sorbed water in Na- and Ca-montmorillonite, Na- and Ca-hectorite, and untreated kaolin. Clay samples were obtained from Ward's Natural Science Establishment, Inc. The montmorillonite and hectorite were saturated by adding a two molar chloride salt solution of either Na or Ca followed by three cycles of shaking, centrifuging, and pouring off the supernatant. Two hydrating methods were used. In the first samples were saturated and air dried while in the second saturated samples were equilibrated at a fixed moisture tension. Sample measurements taken include relaxation rate, pulse gradient diffusion, and tritium diffusion.

RHO-SA-121 PC **A02**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Application of Hydraulic Conductivity Scaling to Infiltration: Drainage Field Tests.
R. B. Sisson, and A. G. Gibbs. Jul 79, 11p CONF-7908100-1
Contract EY-77-C-06-1030
American Society of Agronomy conference, Ft Collins, CO, USA, 5 Aug 1979.

Spatial variability of hydraulic properties is of theoretical and practical importance in soil physics. Theoretically, there is the question as to how the variability might be best incorporated into existing predictive equations. Practically, spatial variability requires a large number of field and laboratory observations to characterize a soil. Scaling of hydraulic properties of soils is developed, treating spatial variability vertically. The vertical scaling results in a scaled depth coordinate and a scaled moisture content. Once this vertical scaling has been accomplished, the scaled profile concept of Warrick, et al (1977) is used to combine profiles from different locations across the field. (ERA citation 05:014219)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A083 054/7 Not available NTIS
McGill Univ Montreal (Quebec) Dept of Electrical Engineering
Structure and Properties of RF Sputtered ZnO Transducers,
A. H. Fahmy, and Eric L. Adler. 10 May 71, 4p DRB-REPRINT-4039

Availability: Pub. in IEEE TRansactions on Sonics and Ultrasonics, vSU-19 n3 p346-349 Jul 72 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 069/5 Not available NTIS
Toronto Univ (Ontario) Dept of Electrical Engineering
V-Groove (VMOS) Conductively Connected Charge Coupled Devices,
C. M. Parks, and C. A. T. Salama. 13 Jan 75, 8p
Availability: Pub. in Solid-State Electronics, v18 p1061-1067 1975 (No copies furnished by DTIC).

No abstract available.

AD-A083 122/2 PC **A04**/MF **A01**
RCA Corp Lancaster PA SSD-Electro-Optics and Devices
Manufacturing Methods and Technology Measure for Fabrication of Silicon Transcalent Rectifier.
Interim rept. 17 Dec 78-22 Oct 79,
B. B. Adams, M. F. DeVito, W. L. Krown, and R. E. Reed. Oct 79, 64p
Contract DAAK70-78-C-0120

Successfully completed were the fabrication and testing of the ten confirmatory samples of Silicon Transcalent Rectifiers. This report thoroughly describes the test results as well as the basis for selecting the prototype design. It also includes a picture or block diagram of each test circuit utilized. All devices passed all inspections with a yield of 100%.

AD-A083 131/3 PC **A02**/MF **A01**
Hughes Aircraft Co Torrance CA Electron Dynamics Div
3 2 Millimeter Wave Transmitter Tube.
Interim rept. no. 2, 1 Feb-31 May 79,
J. A. Davis. Mar 80, 24p DELET-TR-78-3015-2
Contract DAAB07-78-C-3015

The objective of this program is the development of 3.2 millimeter wave tubes having the smallest possible volume, lowest possible weight, and the lowest potential production cost without compromise of performance. The program consists of two parallel phases, the first being concerned with the 100 W TWT and the second with the 1 kW TWT. Considerable progress has been made in the design of the 100W peak (50W avg.) power TWT, designated the 982H. The basic rf circuit has been tentatively designed, subject to further evaluation by testing with scaled X-band parts. The windows, taper(transformer), collector, and magnets have been designed. The electrical design of the gun is nearly complete, and the mechanical layout must still be prepared. A thicker (0.020 in.) vacuum sheath will be used on this tube, rather than the normal 0.005 in. thick sheath which has been used on most Hughes EDD mm-wave TWT's to date. The thicker sheath will give greater structural stability to the circuit. Also, the magnetic pole pieces will be brazed directly to this sheath, creating precise and secure alignment of the magnets to the rf circuit.

AD-A083 196/6 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Advanced Electronic Technology.
Quarterly technical summary rept. 1 Aug-31 Oct 79,
Alan J. McLaughlin, and Alan L. McWhorter. 15 Nov 79, 22p ESD-TR-79-268
Contract F19628-80-C-0002
See also report dated 15 Aug 79, AD-A077 589.

Contents: MNOS Memory; Restructurable Logic Devices; Processing and Analysis; Solid State Device Research; Quantum Electronics; Materials Research; Microelectronics; and Analog Device Technology.

AD-A083 287/3 PC **A04**/MF **A01**
Varian Associates Inc Palo Alto CA Solid State Lab
Normally-Off GaAs FET Monolithic Technology.
Final rept. 23 May 78-23 Aug 79,
Timothy J. Maloney, and C. Burleigh Cooper, III. Oct 79, 69p
Contract N00173-78-C-0104

Al(.5)Ga(.5)As gate heterojunction field-effect transistors (HJFETs) have been fabricated using organometallic (OM) epitaxy and tested. Growth of the FET active layer on an undoped buffer layer has been shown to produce less velocity degradation at the channel-substrate interface than if the active layer is grown directly on a Cr-doped substrate. HJFETs have been fabricated by growing the p-Al(.5)Ga(.5)As and p+-GaAs OM gate layers on mesa-etched vapor-phase epitaxy (VPE) active layers and also by growing all three layers by OM epitaxy. Electrical measurements on normally-on and normally-off HJFETs indicated a problem at the p-Al(.5)Ga(.5)As/n-GaAs interface, later confirmed by the finding of significant amounts of oxygen in the Al(.5)Ga(.5)As. Microwave small signal and large signal switching measurements were made on HJFETs with 2x300 micron gates and on Schottky barrier FETs (SBFETs) with 1x200 micron Al gates intended to simulate normally-off HJFETs. Circuit models were derived from the small-signal measurements and gate propagation delays were derived from the switching measurements. A 2-micron gate normally-on HJFET had 47 psec gate propagation delay while a 1-micron gate SBFET (simulated normally-off HJFET) had 27 psec gate propagation delay. (Author)

AD-A083 367/3 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Main Directions of Progress in Solid State Microwave Electronics,
Adam Smolinski. 11 Jul 79, 20p Rept no. FTD-ID(RS)T-0852-79
Edited trans. of Elektronika (Poland) v19 n1 p2-7 1978.

No abstract available.

AD-A083 399/6 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Tunable Narrow-Band Thin-Film Waveguide Grating Filters,
Sei-hee Kim, and Clifton G. Fonstad. 9 Apr 79, 5p
Contract DAAG29-78-C-0020
Pub. in IEEE Jnl. of Quantum Electronics, vQE-15 n12 p1405-1408 Dec 79.

No abstract available.

AD-A083 450/7 PC **A06**/MF **A01**
Hughes Aircraft Co Torrance CA Torrance Research Center
140 GHz Pulsed Impatt Combiner High Power Source.
Final rept. 1 Jul 77-30 Nov 78,
T. T. Fong, T. A. Midford, E. M. Nakaji, and Y. C. Ngan. Jan 80, 104p HAC-W-42585, ARBRL-CR-00414, AD-E430 384
Contract DAAK11-77-C-0040

The objective of this program was to develop silicon IMPATT diode and power combiner circuit technology in order to demonstrate improved pulse power generating capability at 140 GHz. The program efforts have led to significant advances in the state-of-the-art for pulsed solid state power generation in D-band. The diodes fabricated for this program were double drift IMPATTs with active regions formed by a combination of n-type epitaxial growth and multiple dose/energy p-type ion implants. Copper heat sinks were used. The most successful diode package configuration was a double quartz standoff configuration. The three types of power combining structures investigated were: 1) A resonant rectangular waveguide structure with center-mounted diodes. 2) A variation of (1), employing the coplanar biasing configuration. 3) A rectangular waveguide combiner with sidewall-mounted diodes (Kurakowa circuit). The rectangular cavity with sidewall mounted diodes was by far the most successful. In this circuit, power from two pulsed diodes was combined with approximately 90% combining efficiency. High peak power output at 140 GHz was achieved for both single and multiple diode oscillators. Single diode peak power levels of 3.0 watts at 3% efficiency were obtained for a 100 ns pulse length and a 50 KHz pulse repetition frequency. A two-diode power combiner based on an oversize version of Kurakowa circuit was constructed which produced 3.0 watts of peak output power. Two high power pulsed sources complete with modulators were delivered to the Army. One of these sources is a single diode oscillator, the other a two diode power combiner oscillator.

AD-A083 533/0 PC **A18**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Theory of Irregular Waveguides with Slowly Changing Parameters,
B. Z. Katsenelenbaum. 5 Apr 79, 408p Rept no. FTD-ID(RS)T-0243-79
Unedited machine trans. of Teoriya Neregulyarnykh Volnovodov Medlenno s Menyayushchimisya Parametrami (USSR) p1-215 1961.

No abstract available.

AD-A083 560/3 PC **A04**/MF **A01**
Range Commanders Council White Sands Missile Range NM Telemetry Group
Directory of Transducer Users.
4th edition.
Mar 80, 56p
Supersedes report dated May 78, AD-A053 564.

The Directory of Transducer Users is a compilation of knowledgeable transducer personnel at various government activities, aerospace contractors and universities.

EPRI-EL-1187 PC **A05**/MF **A01**
Gould-Brown Boveri, Colmar, PA.
Vacuum Arc Commutator for Resistive Fault Current Limiter. Final Report.
R. Dethlefsen, and J. Mylius. Sep 79, 84p

A triggered vacuum arc commutating switch, based on magnetic modulation, has been evaluated for application to a resistive fault current limiter at transmission voltages. A self-contained turn-on, turn-off switch has been demonstrated for the multi-MW power level. Up to 9 kA have been interrupted. Transient recovery voltages ranged up to 20 kV. Parallel shunt capacitance increases the interruption ability, particularly at higher source voltages. (ERA citation 05:013536)

N80-21669/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Multistage Depressed Collector with Efficiency of 90 to 94 Percent for Operation of a Dual-Mode Traveling Wave Tube in the Linear Region.
P. Ramins, and T. A. Fox. Apr 80, 16p NASA-TP-1670, E-9975

An axisymmetric, multistage, depressed collector of fixed geometric design was evaluated in conjunction with an octave bandwidth, dual mode traveling wave tube (TWT). The TWT was operated over a wide range of conditions to simulate different applications. The collector performance was optimized (within the constraint of fixed geometric design) over the range of TWT operating conditions covered. For operation of the TWT in the linear, low distortion range, 90 percent and greater collector efficiencies were obtained leading to TWT overall efficiencies of 20 to 35 percent, as compared with 2 to 5 percent with an undepressed collector. With collectors of this efficiency and minimized beam interception losses, it becomes practical to design dual mode TWT's such that the low mode can represent operation well below saturation. Consequently, the required pulse up in beam current can be reduced or eliminated, and this mitigates beam control and dual mode TWT circuit design problems. For operation of the dual mode TWT at saturation, average collector efficiencies in excess of 85 percent were obtained for both the low and high modes across an octave bandwidth, leading to a three to fourfold increase in the TWT overall efficiency.

N80-21672/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
High Power Thyristors with 5 Kv Blocking Voltage. Volume 1: Development of High-Voltage Thyristors (4.5 Kv) with Good Dynamic Properties.
K. Lock, H. Patalong, and K. Platzoeder. Oct 79, 35p NASA-TM-75449, BMFT-FB-T-77-22
Contract NASW-3199

Transl. Into English from German Report Bmft-FB-T-77-22, V. 1, Dec. 1977. Original Language Document Was Announced as N7917164. Transl. By Kanner (Leo) Associates, Redwood City, Calif., Original DOC. Prep. By Siemens, a. G., Munich.

Using neutron irradiated silicon with considerably lower spread in resistivity as compared to conventionally doped silicon it was possible to produce power thyristors with breakdown voltages between 3.5 kV and 5.5 kV. The thyristor pellets have a diameter of 50 mm. Maximum average on-state currents of 600 to 800 A can be reached with these elements. The dynamic properties of the thryistors could be improved to allow standard applications up to maximum repetitive voltages of 4.5 kV.

PAT-APPL-6-035 158 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Ceramic Components for MHD Electrode.
Patent Application,
D. D. Marchant. Filed 2 May 79, 13p
Contract EY-76-C-06-1830
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A ceramic component which exhibits electrical conductivity down to near room temperatures has the formula: Hf/sub x/In/sub y/A/sub z/O sub 2 where x = 0.1 to 0.4, y = 0.3 to 0.6, z = 0.1 to 0.4 and A is a lanthanide rare earth or yttrium. The component is suitable for use in the fabrication of MHD electrodes or as the current leadout portion of a composite electrode with other ceramic components. (ERA citation 05:020758)

PATENT-4 180 484
Not available NTIS
Department of Energy, Washington, DC.
Ceramic Component for Electrodes.
Patent,
D. D. Marchant. Filed 14 Jun 78, patented 25 Dec 79, 6p PAT-APPL-915 419
Supersedes PAT-APPL-915 419-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A ceramic component suitable for preparing MHD generator electrodes consists of HfO sub 2 and sufficient Tb sub 4 O sub 7 to stabilize at least 60 volume percent of the HfO sub 2 into the cubic structure. The ceramic component may also contain a small amount of PrO sub 2 , Yb sub 2 O sub 3 or a mixture of both to improve stability and electronic conductivity of the electrode. The component is highly resistant to corrosion by molten potassium seed and molten coal slag in the MHD fluid and exhibits both ionic and electronic conductivity. 6 claims. (ERA citation 05:020762)

SAND-79-2122C MF **A01**
Sandia Labs., Albuquerque, NM.
GaAs Ohmic Contacts for High Temperature Devices.
J. A. Coquat, and D. W. Palmer. 1980, 6p CONF-800410-3
Contract EY-76-C-04-0789
Electronic component conference, San Francisco, CA, USA, 28 Apr 1980, Portions of document are illegible.
Microfiche copies only.

Instrumentation requirements for geothermal wells, jet engines, and nuclear reactors have exceeded the high temperature capability of silicon devices. As one part of a program to develop high temperature compound semiconductor devices, four basic ohmic contact systems for n-type GaAs have been evaluated for contact resistance as a function of temperature (24 to 350 exp 0 C) and time (at 300 exp 0 C): Ni/AuGe; Ag/Si and Ag/Ni/Si; Al/Ge and Al/AlGe; and Au/Nb/Si and Pt/Nb/Si. Optimization of processing parameters produced viable high temperature contacts with all but the Al/Ge systems. Aging at 300 exp 0 C changed the contact resistivity in only the Ag/Ni/Si contacts. Film adhesion was excellent for the Al/Ge, Ni/AuGe, and Ag/Si systems as measured with ultrasonic Al wire bond pull strengths. Lower adhesion was noticed with Nb/Si systems measured with gold wire bond pull strengths. (ERA citation 05:016125)

SAND-79-2123C PC **A02**/MF **A01**
Texas A and M Univ., College Station. Dept. of Electrical Engineering.
Materials for 300 to 500 exp 0 C Magnetic Components.
M. H. Weichold, R. K. Pandey, and D. W. Palmer. 1980, 4p CONF-800410-1
Contract EY-76-C-04-0789
Electronic component conference, San Francisco, CA, USA, 28 Apr 1980.

Core materials and winding wire for audio and rf transformers have been investigated to 500 exp 0 C. Audio cores of 2 V Permendur had parameter stability from 25 to 500 exp 0 C and during aging at 450 exp 0 C. High frequency ferrite material, Mix 63, displayed usefulness up to 300 exp 0 C. Both anodized aluminum and ceramic-coated copper wire function to 500 exp 0 C in low voltage or large gauge applications. Components based on these materials operate reliably to 500 exp 0 C. (ERA citation 05:016126)

9B. Computers

AD-A083 046/3 PC **A14**/MF **A01**
Georgia Inst of Tech Atlanta School of Electrical Engineering
The Feasibility of Implementing Multicommand Software Functions on a Microcomputer Network.
Final rept. 1 Jul 78-30 Sep 79,
T. P. Barnwell, J. L. Hammond, J. H. Schlag, and E. B. Wagstaff. Oct 79, 320p ARO-15900.1-A-EL
Grant DAAG29-78-G-0139

This report presents the results of a study of design considerations for hybrid monitor systems for distributed microcomputer networks. The objective of the study was to determine the feasibility of such monitor systems and to look at typical designs. A Detailed survey of literature was carried out and the characteristics of existing monitor systems were established. The report presents a conceptual design for a monitor system for distributed microcomputer networks obtained by adapting certain aspects of existing systems to the specialized requirements of microcomputer networks. Several novel features are incorporated into the design to minimize overhead and enhance useability. A typical implementation of the conceptual design using state-of-the-art hardware is given and its operation on a specific monitoring task is considered in detail.

AD-A083 078/6 PC **A02**/MF **A01**
Georgia Inst of Tech Atlanta School of Information and Computer Science
Theoretical and Empirical Studies on Using Program Mutation to Test the Functional Correctness of Programs.
Technical rept.,
Timothy A. Budd, Richard A. DeMillo, Richard J. Lipton, and Frederick G. Sayward. Feb 80, 17p
GIT-ICS-80/01, ARO-15950.5-A-EL
Contract N00014-79-C-0231, Grant DAAG29-78-G-0121
Prepared in cooperation with Yale Univ., New Haven, CT and California Univ., Berkeley.

A framework for studying the program mutation testing method from both theoretical and empirical viewpoints is presented. (Author)

AD-A083 094/3 PC **A02**/MF **A01**
Southeastern Massachusetts Univ North Dartmouth Dept of Electrical Engineering
On Two-Dimensional ARMA Models for Image Analysis.
Technical rept.,
C. H. Chen. 24 Mar 80, 15p Rept no. SMU-EE-TR-80-3
Contract N00014-79-C-0494

The two-dimensional autoregressive moving-average (2-D ARMA) models have been useful for image coding and compression, statistical image modeling, image feature extraction and segmentation, texture characterization, and image restoration and enhancement. This paper provides a critical review of the 2-D ARMA models for image analysis. Particular emphasis is placed on restoration of noisy images using 2-D ARMA models. Computer results are presented for comparative evaluation study. Problem areas such as order determination are examined. Although there are shortcomings and unsolved problems it is concluded that the models are very effective linear models for image analysis. (Author)

AD-A083 112/3 PC **A07**/MF **A01**
Boeing Aerospace Co Seattle WA Boeing Military Airplane Development
Computer Program Development Specification for IDAMST Operational Flight Programs. Addendum 1. Executive Software.
Nov 76, 139p SPEC-SB-4041, AFAL-TR-76-208-ADD-1
Contract F33615-76-C-1099
Addendum to rept. nos. AFAL-TR-76-208-VOL-1, AD-A047 163 and AFAL-TR-76-208-VOL-2, AD-A055 940. See also Addendum 2, AD-A083 113.

This specification establishes the requirements for performance and design of the Executive Software for the Integrated Digital Avionics for a Medium Short Takeoff and Landing Transport (IDAMST) system. The IDAMST Executive provides the system software services which are utilized by the IDAMST Application Software. These services provide for the execution of real time applications, sharing of common data, interprocessor communication, and communication with and between Remote Terminals required to coordinate the operation of the core elements.

AD-A083 113/1 MF **A01**
Boeing Aerospace Co Seattle WA Boeing Military Airplane Development
Computer Program Development Specification for IDAMST Operational Flight Programs. Addendum 2. Applications Software.
Nov 76, 267p SPEC-SB-4042, AFAL-TR-76-208-ADD-2
Contract F33615-76-C-1099
Addendum to rept. nos. AFAL-TR-76-208-VOL-1, AD-A047 163 and AFAL-TR-76-208-VOL-2, AD-A055 940. See also Addendum 3, AD-A083 114.
Availability: Microfiche copies only.

This part of this specification establishes the requirements for performance, design, test, and qualification of a computer program identified as IDAMST Operational Flight Program Applications Software. This document specifies the software functional requirements for the AMST Mission Scenario. Applications Software functions consist of providing the calculation and control capability necessary for the following mission/operations task areas: Flight and Propulsion, Communications, Navigation and Guidance, Payload, Aircraft Systems, and Defense.

AD-A083 114/9 PC **A03**/MF **A01**
Boeing Aerospace Co Seattle WA Boeing Military Airplane Development
Computer Program Development Specification for IDAMST Operational Flight Programs. Addendum 3. Error Handling and Recovery Software.
Nov 76, 49p SPEC-SB-4043, AFAL-TR-76-208-ADD-3
Contract F33615-76-C-1099
Addendum to rept. nos. AFAL-TR-76-208-VOL-1, AD-A047 163 and AFAL-TR-208-VOL-2, AD-A055 940. See also Addendum 4, AD-A083 115.

This part of this specification establishes the requirements for performance, design, test and qualification of computer programs identified as IDAMST Operational Flight Program, Error Handling and Recovery, IDAMST-OFP-EHAR, CPCI number TBD. This CPCI is used to provide the IDAMST system with a preplanned response to anomalies that occur within the system. The purpose of this specification is to establish the functional and design requirements for the IDAMST Error Handling and Recovery computer programs. Error detection and error recovery strategy has been treated, in this document, separate from the OFP requirements for functional capability. IDAMST OFP EHARS is specified for three major functional areas: Response for errors occurring internal to the IDAMST mission processors, including computer program induced errors, response for errors occurring in the multiplex connecting subsystems of IDAMST, and response for errors occurring in subsystem sensors, actuators, and crew station controls and displays. Within each

functional area, the EHARS software shall accomplish the functions of: Determining that an error of sufficient severity to degrade system performance has occurred, isolate the suspect subsystem, notify the flight crew/IDAMST top level control program where appropriate to configure the faulty subsystem/function out of service.

AD-A083 115/6 PC **A03**/MF **A01**
Boeing Aerospace Co Seattle WA Boeing Military Airplane Development
Computer Program Development Specification for IDAMST Operational Test Programs. Addendum 4.
Nov 76, 27p SPEC-SB-4044, AFAL-TR-76-208-ADD-4
Contract F33615-76-C-1099
Addendum to rept. nos. AFAL-TR-76-208-VOL-1, AD-A047 163 and AFAL-TR-76-208-VOL-2, AD-A055 940. See also Addendum 5, AD-A083 116.

This specification describes the two computer programs which accomplish the ground readiness testing of the IDAMST system. The functional performance requirements design constraints and standards to be used in developing the IDAMST ground test and the computer programs are specified. These computer programs will be executed in the IDAMST core processors prior to a mission in order to accomplish the operational readiness testing of the IDAMST core elements and various IDAMST subsystems.

AD-A083 116/4 PC **A04**/MF **A01**
Boeing Aerospace Co Seattle WA Boeing Military Airplane Development
IDAMST Software Management Plan. Addendum 5.
Nov 76, 54p SPEC-2-8080-IDAMST-21, AFAL-TR-76-208-ADD-5
Contract F33615-76-C-1099
Addendum to rept. nos. AFAL-TR-76-208-VOL-1, AD-A047 163 and AFAL-TR-76-208-VOL-2, AD-A055 940. See also Addendum 1, AD-A083 112.

This plan sets forth basic requirements for the conduct and application of management disciplines to be applied to the development of IDAMST Mission Software. Mission software includes all deliverable operational and support computer programs. The minimum requirements for identifying, controlling, accounting, and reviewing Mission Software elements during development and documentation are specified herein. This plan establishes the practices required to maintain SPO management visibility of the IDAMST Mission Software development effort. It is primarily intended to provide coverage for the following areas: Software identification, including milestone management and documentation practices; Configuration control, including change classification and change processing; Configuration status accounting; and Configuration reviews and audits. Additional subject material is included to provide guidance in areas which impact the application of this plan.

AD-A083 117/2 PC **A20**/MF **A01**
Air Force Avionics Lab Wright-Patterson AFB OH
Computer Program Development Specification for IDAMST Operational Flight Program Application, Software Type B5. Addendum 1.
30 Jul 76, 464p Rept nos. AFAL-TR-76-209-ADD-1, SPEC-SD-2040-PT-1
Addendum to rept. nos. AFAL-TR-76-209-VOL-1, AD-A047 650 and AFAL-TR-76-209-VOL-2, AD-A045 596. See also Addendum 2, AD-A083 118.

This specification establishes the requirements for the Application Software Program of the IDAMST System. This program, the Executive Software and the EHARS Software are the segments of the Operational Flight Program (OFP). The paragraphs below describe the IDAMST software specifications for the Application Software. This computer program together with the Executive will be executed in the IDAMST avionics processors for control and integration of the avionics system elements to satisfy mission requirements. This software contains a top level control structure and lower level controller/calculator modules. The control system includes a master sequencer, a request processor, a configurator and a subsystem status monitor. The lower level modules are organized into Operational Sequencers (OPS), Specialist Functions (SPEC), Display Processes (DISP) and Equipment Processes (EQUIP).

AD-A083 118/0 PC **A07**/MF **A01**
Air Force Avionics Lab Wright-Patterson AFB OH
Computer Program Development Specification for IDAMST Operational Flight Program Executive, Software Type B5. Addendum 2.
30 Jul 76, 144p Rept nos. AFAL-TR-76-209-ADD-2, SPEC-SD-2041-PT-1
Addendum to rept. nos. AFAL-TR-76-209-VOL-1, AD-A047 650 and AFAL-TR-76-209-VOL-2, AD-A045 596. See also Addendum 3, AD-A083 119.

This specification establishes the requirements for performance, design, test, and qualification of a computer program identified as Operational Flight Program (OFP), Executive Software for the Integrated Digital Avionics for the Medium STOL Transport (IDAMST). The IDAMST Executive Software Systems provides the system software services for the application software. It has been divided into three major functions denoted as Master Executive, Local Executive and Monitor Executive Functions. These functions provide services for the execution of real-time applications, data bus management, system control, common data utilization and Remote Terminals communication.

AD-A083 119/8 PC **A05**/MF **A01**
Air Force Avionics Lab Wright-Patterson AFB OH
Computer Program Development Specification for IDAMST Error Handling and Recovery System, Software Type B5. Addendum 3.
30 Jul 76, 83p Rept nos. AFAL-TR-76-209-ADD-3, SPEC-SD-2042-PT-1
Addendum to rept. nos. AFAL-TR-76-209-VOL-1, AD-A047 650 and AFAL-TR-76-209-VOL-2, AD-A045 596. See also Addendum 4, AD-A083 120.

This part of this specification establishes the requirements for performance, design, test and qualifications of a computer program identified as Operational Flight Program (OFP) IDAMST Error Handling and Recovery System (EHARS) Software. The EHARS Software System is concerned with control of the IDAMST System when system errors and terminal failures occur. In particular, EHARS shall: Perform bus error handling; Perform system failure analysis and modification of the BCIU list accordingly; Halt processing to allow the monitor processor to assume control if a processor/BCIU fails; and To direct the reconfiguration scheme in case of processor failure.

AD-A083 120/6 PC **A07**/MF **A01**
Air Force Avionics Lab Wright-Patterson AFB OH
Computer Program Development Specification for IDAMST Operational Test Program, Software Type B5. Addendum 4.
30 Jul 76, 139p Rept nos. AFAL-TR-76-209-ADD-4, SPEC-SD-2043-PT-1
Addendum to rept. nos. AFAL-TR-76-209-VOL-1, AD-A047 650 and AFAL-TR-76-209-VOL-2, AD-A045 596. See also Addendum 5, AD-A083 121.

This specification establishes the requirements for the Operational Test Program function of the IDAMST System. The paragraphs below describe the IDAMST specifications for the Operational Test Programs. These computer programs will be executed in the IDAMST avionics processors in order to determine the operational readiness of the IDAMST core elements and avionics subsystems, to display the equipment status to the ground operator and to initialize tables which describe equipment status.

AD-A083 121/4 PC **A04**/MF **A01**
Douglas Aircraft Co Long Beach CA Government Avionics Dept
Configuration Management Plan for IDAMST Software. Addendum 5.
30 Jul 76, 65p MDC-J7278-ADD-5, AFAL-TR-76-209-ADD-5
Contract F33615-76-C-1297
Addendum to rept. nos. AFAL-TR-76-209-VOL-1, AD-A047 650 and AFAL-TR-76-209-VOL-2, AD-A045 596. See also Addendum 1, AD-A083 117.

This configuration management plan defines the policies and methods for implementation of configuration management for the IDAMST software. The plan defines the basic functions of configuration management (CM) and the baselines or reference points for development and control of the IDAMST software documents and products. The major impact of configuration management is in the development phase of the program. Since program plans, schedules and contractual requirements for the development phase have not yet been formulated, this plan, of necessity, provides a general approach which will require modification and updating when this information is available. The major functions of configuration management covered by this plan are: Configuration Identification, Configuration Control, Configuration Status Accounting, and Verification.

AD-A083 126/3 PC **A02**/MF **A01**
Hawaii Univ Honolulu Dept of Information and Computer Science
An Investigation of Computer Systems Problems.
Final rept. 15 Aug 77-14 Feb 80,
W. W. Peterson, A. Lew, and S. Y. Itoga. Mar 80, 24p ARO-14707.7-EL
Grant DAAG29-77-G-0196

The main problem areas investigated were decision tables, grammatical inference, string merging, computational complexity analysis, and proof checking. (Author)

AD-A083 163/6 PC **A11**/MF **A01**
Naval Surface Weapons Center Dahlgren VA
NSWC/DL Library of Mathematics Subroutines,
Alfred H. Morris, Jr. Mar 80, 243p Rept no. NSWC/TR-79-338
Supersedes Rept. no. NSWC/DL-TR-3843, AD-A056926.

This report describes a high quality collection of general-purpose mathematics subroutines for the CDC 6700 computer. The routines are written in FORTRAN. Included are routines for computing Bessel functions, evaluating the complete and incomplete elliptic integrals of the first, second, and third kinds, finding least squares solutions for systems of linear equations, computing eignevalues and eigenvectors of matrices, solving linear programming problems, computing definite integrals, and solving systems of ordinary differential equations. The routines have been selected from a variety of sources. (Author)

AD-A083 164/4 PC **A05**/MF **A01**
Naval Surface Weapons Center Dahlgren VA
TRIDENT Higher Level Language Syntax Definition.
Final rept.,
Paul Shebalin. Nov 79, 95p Rept no. NSWC/TR-3914
Supersedes Rept. no. NSWC/DL/TN-K-9/78 dated May 78.

This document presents a complete and rigorous syntactic definition of the TRIDENT Higher Level Language (THLL). Two different formulations are included: syntax graphs and productions. The syntax graphs provide a visual aid to quickly determine the structure of all THLL constructs. The productions express the syntax as it is used, essentially, by the compiler. The TRIDENT Higher Level Language (THLL) is a procedure-oriented programming language for use in writing software programs for the TRIDENT Digital Control Computer (TDCC). This computer is to be used in the Mk 98 FCS and the Mk 88 Mod fire control system (FCS).

AD-A083 203/0 PC **A19**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
The Use of Computers as a Design Tool.
Conference proceedings.
Jan 80, 449p Rept no. AGARD-CP-280
Presented at the Flight Mechanics Panel Symposium on The Use of Computers as a Design Tool 3-6 Sep 79 Neubiberg (Germany). See also Rept. no. AGARD-AR-158.

The proceedings consist of the papers presented at the FMP Symposium on 'The Use of Computers as a Design Tool'. Sessions were held on the topics of: specifications and assessments of requirements, computer-aided design and computer graphics, computational aerodynamics and design, structural analysis and design, propulsion and systems design. A comprehensive Technical Evaluation of the meeting appears in AGARD Advisory Report No. 158. (Author)

AD-A083 205/5 PC **A04**/MF **A01**
Boeing Aerospace Co Seattle WA
Software Configuration Management. One of the Software Acquisition Engineering Guidebook Series.
Final rept.,
M. P. Kress. 2 Jan 79, 66p D180-24727-1, ASD-TR-78-48
Contract F33657-76-C-0723

This report is one of a series of guidebooks whose purpose is to assist Air Force Program Office Personnel and other USAF acquisition engineers in the acquisition engineering of software for Automatic Test Equipment and Training Simulators. This guidebook provides guidance in the preparation, imposition and enforcement of software configuration management requirements and recommended procedures. (Author)

AD-A083 206/3 PC **A06**/MF **A01**
Boeing Aerospace Co Seattle WA
Computer Program Documentation Requirements. One of the Software Acquisition Engineering Guidebook Series.
Final rept.,
W. R. Burr. Jul 77, 105p D180-20675-1, ASD-TR-78-46
Contract F33657-76-C-0723

This report is one of a series of guidebooks whose purpose is to assist Air Force Program Office Personnel and other USAF acquisition engineers in the acquisition engineering of software for Automatic Test Equipment and Training Simulators. This guidebook identifies documentation requirements and describes acquisition engineering tasks associated with computer program documentation. (Author)

AD-A083 207/1 PC **A05**/MF **A01**
Boeing Aerospace Co Seattle WA
Requirements Specification. One of the Software Acquisition Engineering Guidebook Series.
Final rept.,
D. C. Whitmore. 2 Jan 79, 100p D180-20676-1, ASD-TR-78-45
Contract F33657-76-C-0723

This report is one of a series of guidebooks whose purpose is to assist Air Force Program Office Personnel and other USAF acquisition engineers in the acquisition engineering of software for Automatic Test Equipment and Training Simulators. This guidebook describes the requirements specification process. Acquisition engineering tasks are described starting with definition of using command needs and continuing through procurement contract. (Author)

AD-A083 208/9 PC **A05**/MF **A01**
Boeing Aerospace Co Seattle WA
Software Cost Measuring and Reporting. One of the Software Acquisition Engineering Guidebook Series.
Final rept.,
D. L. Bowie, R. B. Doggett, D. Fowler, and R. L. Prevele. 2 Jan 79, 97p D180-22813-1, ASD-TR-78-44
Contract F33657-76-C-0723

this report is one of a series of guidebooks whose purpose is to assist Air Force Program Office Personnel and other USAF acquisition engineers in the acquisition engineering of software for Automatic Test Equipment and Training Simulators. This guidebook describes cost considerations associated with USAF and contractor cost estimating, cost distribution and cost reporting. Also, computer programming cost monitoring and control tasks are described. (Author)

AD-A083 209/7 PC **A05**/MF **A01**
Boeing Aerospace Co Seattle WA
Computer Program Maintenance. One of the Software Acquisition Engineering Guidebook Series.
Final rept.,
D. C. Whitmore, R. D. Bivans, D. L. Bowie, and M. P. Kress. Dec 77, 92p D180-22812-1, ASD-TR-78-43
Contract F33657-76-C-0723

This report is one of a series of guidebooks whose purpose is to assist Air Force Program Office Personnel and other USAF acquisition engineers in the acquisition engineering of software for Automatic Test Equipment and Training Simulators. This guidebook describes the software maintenance life cycle, including maintainability, maintenance tasks and required maintenance resources. (Author)

AD-A083 229/5 PC **A04**/MF **A01**
Stanford Univ CA Dept of Computer Science
METAFONT: A System for Alphabet Design.
Technical rept.,
Donald E. Knuth. Sep 79, 56p Rept nos. STAN-CS-79-762, AIM-332
Contract N00014-76-C-0330, Grant NSF-MCS72-03752

This is the user's manual for METAFONT, a companion to the TEX typesetting system. The system makes it fairly easy to define high quality fonts of type in a machine-independent manner; a user writes programs in a new language developed for this purpose. By varying parameters of a design, an unlimited number of typefaces can be obtained from a single set of programs. The manual also sketches the algorithms used by the system to draw the character shapes. (Author)

AD-A083 233/7 PC **A24**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
Data-Structuring Operations in Concurrent Computations.
Doctoral thesis,
David Lee Isaman. Oct 79, 566p Rept nc. MIT/LCS/TR-224

This thesis proposes operational specifications for a Structure Memory (SM). A specialized hardware component of a general-purpose computing system, the SM would directly execute operations on dynamically structured data stored in it. The computing system is assumed capable of exploiting program concurrency at the machine-instruction level. Concurrency among a set of program instructions which can examine or modify the same structure must be carefully controlled, if the program is to be determinate. The first of two major contributions of the thesis is a combination hardware/software discipline which affords maximal concurrency consistent with determinacy. Its key feature is that the SM will not return a given pointer until certain previously-returned pointers to the same structure are no longer available as operands. The second major contribution is the entry-execution model of concurrent computation. Reversing the emphasis of most previous work, this model concentrates on the operations performed by instructions, while abstracting away details of how operands are passed among them and how their execution order is determined. The essence of structure operators, that the result of an execution of one may depend on the input to previous executions of that and other operators, is given a natural expression in the new model. A proof of sufficient conditions for determinacy is made more generally applicable through use of the entry-execution model as its medium.

AD-A083 263/4 PC **A06**/MF **A01**
RAND Corp Santa Monica CA
Formal Methods for Communication Protocol Specification and Verification.
Final rept.,
Carl A. Sunshine. Nov 79, 104p Rept no. RAND/N-1429-ARPA/NBS
Contract MDA903-78-C-0029, ARPA Order-3460

Increasingly numerous and complex communication protocols are being employed in distributed systems and computer networks of all types. This Note describes some of the more formal techniques that are being developed to facilitate design of correct protocols. Our major conclusion is that it is vital to specify the services provided by a protocol layer in addition to specifying the cooperating protocol entities which make up the layer. We develop service specifications of several representative protocols by using formal techniques from software engineering such as abstract machines and buffer histories. A survey of protocol verification methods and a bibliography indexed by key phrases are also provided. (Author)

AD-A083 266/7 PC **A02**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Computer Science
Concerning Classes within Classes.
Technical memo.
Richard J. Orgass. 15 Jan 79, 9p VPI-TM-79-1, AFOSR-TR-80-0282
Grant AFOSR-79-0021

Two examples are used to show how the SIMULA restriction on the use of dot notation to reference attributes of classes limits the abstraction mechanism provided by classes. (Author)

AD-A083 267/5 PC **A02**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Computer Science
DIALOG. A SIMULA Class for Writing Interactive Programs.
Technical memo.,
Richard J. Orgass. 4 May 79, 24p VPI-TM-79-3, AFOSR-TR-80-0299
Grant AFOSR-79-0021

A SIMULA class containing procedures for easily writing programs that interact with a user by asking questions at run time and which dynamically name and open files at run time is described. The class uses properties of IBM SIMULA that are not available in other implementations. It also depends on the EBCDIC character codes rather than ASCII but it is assumed that a user's terminal is an ASCII terminal. (Author)

AD-A083 268/3 PC **A03**/MF **A01**
Maryland Univ College Park Dept of Computer Science
An Algorithm for Mutual Exclusion in Computer Networks.
Interim technical rept.,
Glenn Ricart, and Ashok K. Agrawala. Feb 80, 36p TR-869, AFOSR-TR-80-0303
Grant AFOSR-78-3654
Revision to rept. nos. TR-638 dated Feb 78 and TR-743 dated Mar 79.

An algorithm is proposed which creates mutual exclusion in a computer network whose nodes can communicate only by messages and do not share memory. The algorithm sends only 2*(N-1) Messages, where N is the number of nodes in the network, per critical section invocation. This number of messages is a minimum if parallel, distributed, symmetric control is used; hence, the algorithm is optimal in this minimal under some general assumptions. Like Lamport's 'bakery algorithm,' unbounded sequence numbers are used to provide first-come first-served priority into the critical section. It is shown that the number can be contained in a fixed amount of memory by storing it as the residue of a modulus. The number of messages required to implement the exclusion can be reduced by using sequential node-by-node processing, by using broadcast message techniques or by sending information through timing channels. The readers and writers problem is solved by a simple modification of the algorithm. The modifications necessary to make the algorithm robust are described. (Author)

AD-A083 279/0 PC **A02**/MF **A01**
Connecticut Univ Storrs
Data Structure Definition and Access Control Facilities for Languages Designed for the Development of Reliable Software.
Final rept. 1 Sep 78-31 Aug 79,
Billy G. Claybrook. Apr 80, 15p ARO-16264.2-EL
Grant DAAG29-78-G-0118

The purpose of the research described here was to develop a data structure definition facility (DSDF) and an access control facility suitable for inclusion in high-level programming languages. The research was not intended to include the design of a complete language but instead involved the development of programming language features that aid in the development of languages designed for producing reliable software. The DSDF was to be capable of specifying and implementing a wide variety of views of data. The intentions were to develop a facility capable of defining real world data objects as well as system-oriented data objects. In addition, the DSDF was to merge the language view of real world and system data objects. (Author)

AD-A083 283/2 PC **A09**/MF **A01**
University of Southern California Los Angeles Image Processing Inst
Textured Image Segmentation.
Technical rept.,
Kenneth Ivan Laws. Jan 80, 190p Rept no. USCIPI-940
Contracts F33615-76-C-1203, DARPA Order-3119

The problem of image texture analysis is introduced, and existing approaches are surveyed. An empirical evaluation method is applied to two texture measurement systems, co-occurrence statistics and augmented correlation statistics. A spatial-statistical class of texture measures is then defined and evaluated. It leads to a simple class of texture energy transforms, which perform better than any of the preceding methods. These transforms are very fast, and can be made invariant to changes in luminance, contrast, and rotation without histogram equalization or other preprocessing. Texture energy is measured by filtering with small masks, typically 5x5, then with a moving-window average of the absolute image values. This method, similar to human visual processing, is appropriate for textures with short coherence length or correlation distance. The filter masks are integer-valued and separable, and can be implemented with one-dimensional or 3x3 convolutions. The averaging operation is also very fast, with computing time independent of window size. Texture energy planes may be linearly combined to form a smaller number of discriminant planes. These principal component planes seem to represent natural texture dimensions, and to be more reliable texture measures than the texture energy planes. Texture segmentation or classification may be accomplished using either texture energy or principal component planes as input. This study classified 15x15 blocks of eight natural textures. Accuracies of 72% were achieved with co-occurrence statistics, 65% with augmented correlation statistics, and 94% with texture energy statistics. (Author)

AD-A083 298/0 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
A Method for Computer-Aided Design of Sabot-Penetrator Packages.
Final rept.,
Kent D. Kimsey. Feb 80, 48p ARBRL-MR-02988, AD-E430 400

The application of interactive computer graphics in developing a tool for expediting the analysis and design of axisymmetric structures such as sabot-penetrator packages is discussed. A pre-processor which has been developed to allow the designer to interactively modify finite element models of sabot-penetrator packages for quasi-static analysis with SAP IV (Structural Analysis Program) is described along with the accompanying post-processor. User manuals for the pre- and post-processors are provided.

AD-A083 313/7 PC **A10**/MF **A01**
University of Southern California Los Angeles Image Processing Inst
Design of SVD/SGK Convolution Filters for Image Processing.
Technical rept.,
Sang Uk Lee. Jan 80, 201p Rept no. USCIPI-950
Contract F33615-76-C-1203, DARPA Order-3119

This dissertation describes a special-purpose signal processor for performing two-dimensional convolution with a minimum amount of hardware using the concepts of singular value decomposition (SVD) and small generating kernel (SGK) convolution. The SVD of an impulse response of a two-dimensional finite impulse response of a two-dimensional finite impulse response (FIR) filter is employed to decompose a filter into a sum of two-dimensional separable linear operators. These linear operators are themselves decomposed into a sequence of small kernel convolution operators. The SVD expansion can be truncated to a relatively few terms without significantly affecting the filter output. A statistical analysis of finite word-length effects in SVD/SGK convolution is presented. Two important issues, related to the implementation of the filters in cascade form, scaling and section ordering, are also considered. Computer simulation of image convolution indicates that 12 bits are required for the SGK/SVD accumulator memory and 16 bits are required for quantization of filter coefficients to obtain results visually indistinguishable from full precision computation. A normalized mean square error between the SVD/SGK processed output and the direct processed output is chosen as an objective criterion function. It is shown that a subjective visual improvement is obtained by resetting the output mean to be equal to the input mean. The transformation technique developed for the one-dimensional case is used to parametrically modify the cutoff frequency of a baseline SVD/SGK convolution filter.

AD-A083 318/6 PC **A04**/MF **A01**
Rome Air Development Center Griffiss AFB NY
ITAS - A Better Way of Coding.
Technical rept.,
John Feldman. Mar 80, 61p Rept no. RADC-TR-80-67

This report describes a software program which can be used as an alternative to print oriented user languages such as BASIC and FORTRAN. The design and use of this 'language' is described. The language uses a basic kernel of graphic symbols interconnected by the user to designate data flow within the program. This allows the itas user to simulate and model scientific and engineering problems directly. (Author)

AD-A083 354/1 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
150(DJS-11) Software.
17 Apr 79, 31p Rept no. FTD-ID(RS)T-1664-78
Edited trans. of Pei-Ching Ta-Hsueh Ksueh-Pao--Tzu-Jan Ko Hsueh-Pan (China) p144-157 Aug 74, by H. P. Lee.

No abstract available.

AD-A083 356/6 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Computers in the Service of Science,
Jerzy Kolendowski, and Marek Ksiezyk. 2 May 79, 19p Rept no. FTD-ID(RS)T-0333-79
Edited trans. of Informatyka (Poland) v13 n12 p14-17 1977, by Erik Zolar.

No abstract available.

AD-A083 359/0 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Hardware Elements of the Unified System of Digital Computers Peripheral Devices of the Unified System,
J. Pelc, J. Sobaniec, and F. Swiderski. 11 Jul 79, 38p Rept no. FTD-ID(RS)T-0547-79
Edited trans. of Informatyka (Poland) v9 n9 p15-28 1973.

No abstract available.

AD-A083 392/1 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Architecture Research Facility: An Experiment in Software Engineering.
Final rept.,
Honey S. Elovitz. 31 Dec 79, 35p NRL-8346, AD-E000 393

Software developers often complain that researchers in the field of software engineering propose new ideas without testing these ideas in practical applications. The Architecture Research Facility (ARF) was developed utilizing several software engineering techniques in order to discover their usefulness in actual software system developments. Such techniques as the complete design and documentation of the individual components and interfaces prior to coding; design reviews; code specification in pseudolanguage; code reading prior to testing; information-hiding modules; run-time error-checking mechanisms; strong-typing; and the use of support software tools are discussed. We describe the motivation for using the techniques as well as how these techniques were applied to ARF's development. Staff reactions to using these techniques were favorable, although at the time some frustration at the lack of apparent coding progress was felt. Our results would prove useful to software developers planning to use new development techniques, since we highlight many of these techniques' strengths and weaknesses.

AD-A083 424/2 PC **A13**/MF **A01**
Westinghouse Word Processing Center Pittsburgh PA
Graphics Compatibility System (GCS) Programmer's Reference Manual.
Final rept.
Oct 79, 286p WES-MP-0-79-5
Contract DACW39-78-M-2676

This reference manual explains the function of each subroutine in the Graphics Compatibility System (GCS). GCS is a Fortran-based computer graphics system designed for interactive/passive use a wide variety of graphics hardware. Contained within this section are the detailed descriptions and usage instructions of all of the user callable routines which make up the GCS graphics system, and a discussion of the various options available to the user. GCS is available in two versions, a two-dimensional version, and a three-dimensional version. The three dimensional version is a sophisticated, highly capable package having such features as graphical data structures, text processing, and of course, three-dimension graphics. The two-dimensional version is the older, less sophisticated version. While possessing fewer capabilities, it is still supported, since it offers the benefits of a smaller central memory requirement, and a higher execution speed, while still fulfilling most of the normal graphics requirements. In general, the two-dimension version is a proper subset of the three dimension version meaning that all elements of two-dimension GCS are contained within the three dimensional version.

AD-A083 428/3 PC **A05**/MF **A01**
Logicon Inc Lexington MA
Automated Test Case Generator.
Final technical rept. Aug 78-Aug 79,
Daniel M. Leach, and Sukhamay Kundu. Feb 80, 76p RADC-TR-80-31
Contract F30602-78-C-0231

This report summarized the results of a study to advance the state-of-the-art in the area of automated software testing. Specific goals were to develop a specification for a system which provides for the automated selection of test cases and the automated generation of test data. The report describes the requirement for such a system and presents a design approach which will fulfill the requirement. Included is a sample software program which is manually carried through the various steps of the proposed system. The report closes with a survey of the state-of-the-art of software testing. (Author)

AD-A083 433/3 PC **A12**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
The Architecture of an Object Based Personal Computer.
Doctoral thesis,
Allen William Luniewski. Mar 80, 263p Rept no. MIT/LCS/TR-232
Contract N00014-75-C-0661

This thesis proposes the architecture of a personal computer that provides better support than conventional architectures for recently developed concepts of structured programming. The architecture separates implementation and high level language issues. The architecture eliminates the need for an operating system by including, in a language independent manner, the features normally found in operating systems. The architecture allows multiple languages to coexist safely. It is complete; the user has no need to leave the world defined by the architecture to solve a problem, including the important case of executing untrusted programs.

AD-A083 455/6 PC **A05**/MF **A01**
Human Resources Research Organization Alexandria VA
Development of an ADP Training Program to Serve the EPA Data Processing Community.
Final rept.
29 Jul 76, 98p Rept no. HUMRRO-RP-ED-76-33
Contract EPA-68-01-3357
Report on Course Specifications.

This course presents selected elements of the ANSI COBOL language not normally taught in introductory level courses. Topics include: record

structuring; tape file processing; value clauses; the corresponding option of the MOVE statement; divide, compute, perform and alter statements; data representation and conversion; table processing; and indexed sequential and random access file processing. The course workshop will include the testing of coded exercises and problems on a computer system.

AD-A083 487/9 PC **A03/MF A01**
Operating Systems Inc Woodland Hills CA
Associative File Processor.
Final technical rept.,
R. L. Pickler, and D. K. Whelchel. Feb 80, 49p
OSI-R79-031, RADC-TR-80-23
Contract F30602-78-C-0133

The objective of this contract was to support advanced software development for the Associative File Processor (AFP). The AFP is a special purpose system utilizing the DEC PDP-11 family of computers, including the AN/GYQ-21(V) processors and disk storage devices. It is designed to search large data bases (1-10 billion characters of on-line files) of unstructured free-text data for multiple, random queries within a reasonable time and at an affordable cost. The AFP and its current prototype software have been especially designed for intelligence applications. The technical effort for this contract was directed toward general improvement of the AFP operation in several areas: increased user interface flexibility, additional utility programs, expanded functional capabilities, etc. For the most part, the goals delineated by the contract have been met. This was accomplished by modifying existing AFP software to expand AFP capabilities and by developing new software modules for additional functions. While the capabilities of the AFP have been significantly increased as a result of the work done under this contract, several other areas for improvement or increased flexibility of the AFP have been suggested.

AD-A083 491/1 PC **A07/MF A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
A Manager for Named, Permanent Objects.
Master's theses for period ending 17 May 79,
Alan Michael Marcum. Apr 80, 139p Rept no. MIT/LCS/TM-162
Contract N00014-75-C-0661

Storing data in a computing system for a long time has been of interest ever since it was possible to do so. Classically, one stores bit- or byte-strings, or perhaps arrays of records. Yet, current programming philosophy stresses data abstraction techniques and concepts. This report describes an object-oriented filing system which stores abstract objects, and allows the user to view the system as though one were storing abstract objects, rather than storing some external representation of the abstractions. Names may be attached to the (permanent) objects, and objects may be contained in (and may contain) other objects. Furthermore, an object may be contained in more than one object, thereby allowing the naming structure to be a network. (Author)

AD-A083 512/4 PC **A04/MF A01**
General Electric Co Arlington VA
A Matched Project Evaluation of Modern Programming Practices. Volume I. Management Report on the ASTROS Plan.
Interim rept. 1 Sep 77-30 Nov 78,
Phil Milliman, and Bill Curtis. Feb 80, 52p
791SP005, RADC-TR-80-6-VOL-1
Contract F30602-77-C-0194
See also Volume 2, AD-A083 513.

A plan for improving software development called Advanced Systematic Techniques for Reliable Operational Software (ASTROS) has been developed. This system provides guidelines for applying the following modern programming practices to software development: Structured design and testing, HIPO charts, Chief programmer teams, Structured coding, Structured walk-throughs, and Program support library. In order to test the utility of these techniques, two development projects (non-real-time) sponsored by SAMTEC from the Metric Integrated Processing System were chosen for a quasi-experimental comparison. This system provides control and data analysis for missile launches. The Lauch Support Data Base (LSDB) was developed under the guidelines of the ASTROS plan, while the Data Analysis Processor (DAP) was developed using conventional techniques. This Volume presents a condensed report of the results of this study which has been prepared for a non-scientific and/or managerial audience. The performance of the LSDB project was comparable to that of similar sized software development projects on numerous criteria. The amount of code produced per man-month was typical of conventional development efforts. Nevertheless, the performance of the LSDB project was superior to that of the DAP project. Thus, the benefits of the modern programming practices employed on the LSDB project were limited by the constraints of environmental factors such as computer access and turnaround time.

AD-A083 513/2 PC **A02/MF A01**
General Electric Co Arlington VA
A Matched Project Evaluation of Modern Programming Practices. Volume II. Scientific Report on the ASTROS Plan.
Interim rept. 1 Sep 77-30 Nov 78,
Phil Milliman, and Bill Curtis. Feb 80, 22p
791SP006, RADC-TR-80-6-VOL-2
Contract F30602-77-C-0194
See also Volume 1, AD-A083 512.

A plan for improving software development called Advanced Systematic Techniques for Reliable Operational Software (ASTROS) is developed. This system provides guidelines for applying the following modern programming practices to software development: Structured design and testing, HIPO charts, Chief programmer teams, Structured coding, Structured walk-throughs, and Program support library. In order to test the utility of these techniques, two development projects (non-real-time) were chosen for a quasi-experimental comparison. This system provides control and data analysis for missile launches. The Launch Support Data Base (LSDB) was developed under the guidelines of the ASTROS plan, while the Data Analysis Processor (DAP) was developed using conventional techniques. This volume presents detailed account of the theories and analyses underlying the results. The performance of the LSDB project was comparable to that of similar sized software development projects on numerous criteria. The amount of code produced per man-month was typical of conventional development efforts. Nevertheless, the performance of the LSDB project was superior to that of the DAP project. Thus, the benefits of the modern programming practices employed on the LSDB project were limited by the constraints of environmental factors such as computer access and turnaround time.

AD-A083 545/4 PC **A03/MF A01**
Naval Research Lab Washington DC
CHEMEQ - A Subroutine for Solving Stiff Ordinary Differential Equations.
Interim rept.,
T. R. Young, Jr. 26 Feb 80, 50p NRL-MR-4091, AD-E000 395

A FORTRAN subroutine (CHEMEQ) which employs the Selected Asymptotic Integration Method (SAIM) for solving the stiff ordinary differential equations associated with reactive flow problems is described and documented. The SAIM algorithm identifies the stiff equations for treatment with a stiffly stable method. The remaining equations are treated with a standard classical method. The algorithm is a very low-overhead method which is particularly efficient when coupled with fluid dynamic calculations. It also gives significant reductions in computational costs for model development.

AD-A083 573/6 PC **A04/MF A01**
Stanford Univ CA Dept of Computer Science
A Hierarchical Associative Architecture for the Parallel Evaluation of Relational Algebraic Database Primitives.
Technical rept.,
David Elliot Shaw. Oct 79, 60p Rept no. STAN-CS-79-778
Contract MDA903-77-C-0322

Algorithms are described and analyzed for the efficient evaluation of the primitive operators of a relational algebra on a proposed non-von Neumann machine based on a hierarchy of associative storage devices. This architecture permits an O(log n) decrease in time complexity over the best known evaluation methods on a conventional computer system, without the use of redundant storage, and using currently available and potentially competitive technology. In many cases of practical import, the proposed architecture may also permit a significant improvement (by a factor roughly proportional to the capacity of the primary associative storage device) over the performance of previously implemented or proposed database machine architectures based on associative secondary storage devices. (Author)

AD-A083 611/4 PC **A02/MF A01**
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Computer Science
Reliable Software through Very High-Level Verification.
Interim rept.,
Richard J. Orgass. 15 Feb 80, 17p VPI-TM-80-2, AFOSR-TR-80-0283
Grant AFOSR-79-0021

A substantial body of software to be used for the research was in operation on a DEC-10 and this software was transported to the Virginia Tech VM/CMS system. Significant difficulties were encountered in bringing this software into satisfactory operation in this environment.

COO-3077-161 PC **A09/MF A01**
New York Univ., NY. Courant Mathematics and Computing Lab.
Optimization of Horizontal Microcode within and Beyond Basic Blocks: An Application of Processor Scheduling with Resources.
J. A. Fisher. Oct 79, 183p
Contract EY-76-C-02-3077

Microprogram optimization is the rearrangement of microcode written vertically, with one operation issued per step, into legal horizontal microinstructions, in which several operations are issued each instruction cycle. The rearrangement is done in a way that approximately minimizes the running time of the code. This problem is identified with the problem of processor scheduling with resource constraints. Thus, the problem of optimizing basic blocks of microcode can be seen to be np-complete; however, approximate methods for basic blocks which have good records in other, similar scheduling environments can be used. In priority list scheduling the tasks are ordered according to some evaluation function, and then schedules are found by repeated scans of the list. Several evaluation functions are shown to perform very well on large samples of various classes of random data-precedence graphs with characteristics similar to those derived from microprograms. A method of spotting resource bottlenecks in the derived data-precedence graph enables one to obtain a resource-considerate evaluation function, in which tasks which contribute directly to or precede bottlenecks have their priorities raised. The complexity of the calculations necessary to compute the lower bound was greatly reduced. A method is suggested for optimizing beyond basic blocks. Groups of basic blocks are treated as if they were one block; the information necessary to control the motion of tasks between blocks is encoded as data-precedence constraints on the conditional tasks. Long paths of code can thus be optimized, with no back branches, by the same methods used for basic blocks. 9 figures, 6 tables. (ERA citation 05:012880)

LA-UR-80-121 PC **A02/MF A01**
Los Alamos Scientific Lab., NM.
Restoration and Analysis of Amateur Movies from the Kennedy Assassination.
J. R. Breedlove, T. M. Cannon, D. H. Janney, R. P. Kruger, and H. J. Trussell. 1980, 14p CONF-800310-1
Contract W-7405-ENG-36
ACSM-ASP convention, St Louis, MO, USA, 9 Mar 1980.

Much of the evidence concerning the assassination of President Kennedy comes from amateur movies of the presidential motorcade. Two of the most revealing movies are those taken by the photographers Zapruder and Nix. Approximately 160 frames of the Zapruder film clearly show the general relation of persons in the presidential limou-

sine. Many of the frames of interest were blurred by focus problems or by linear motion. The method of cepstral analysis was used to quantitatively measure the blur, followed by maximum a posteriori (MAP) restoration. Descriptions of these methods, complete with before-and-after examples from selected frames are given. The frames were then available for studies of facial expressions, hand motions, etc. Numerous allegations charge that multiple gunmen played a role in an assassination plot. Multispectral analyses, adapted from studies of satellite imagery, show no evidence of an alleged rifle in the Zapruder film. Lastly, frame-averaging is used to reduce the noise in the Nix movie prior to MAP restoration. The restoration of the reduced-noise average frame more clearly shows that at least one of the alleged gunmen is only the light-and-shadow pattern beneath the trees. (ERA citation 05:017290)

N80-21729/2 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
The Impact of Data Compression on Supervised Classification of Airborne Multispectral Imagery.
W. Verhoef, and N. J. J. Bunnik. Apr 79, 46p
NLR-TR-79047-L, ESA-CR(P)-1260
Contract ESTEC-3568/78-NL-HP(SC)

An assessment was made of the impact of onboard data compression on the information which a user could extract from multispectral imagery by supervised classification. To simulate the effect of data compression, available airborne MSS data on CCT were compressed and reconstructed and stored on another CCT in the original format. Both CCTs, containing the original and reconstructed multispectral images of an agricultural scene in the Netherlands, were processed by a program for supervised maximum likelihood classification, while the ground locations of the training areas were exactly identical. The effects of data compression and the influence of training area orientation on inter- and intra-class statistics and on the final classification results were investigated. Data compression enhances overall class separability, but reduces distinction between similar classes. Along scan lines, assignment to classes becomes more uniform. Training samples from reconstructed imagery are less representative for along track signal variation, causing many image lines to remain unclassified.

N80-21980/1 PC **A12**/MF **A01**
MITRE Corp., Houston, TEX.
The Crew Activity Planning System Bus Interface Unit.
M. A. Allen. Dec 79, 269p NASA-CR-160566, MTR-473
Contract F19628-80-C-0001

The hardware and software designs used to implement a high speed parallel communications interface to the MITRE 307.2 kilobit/second serial bus communications system are described. The primary topic is the development of the bus interface unit.

N80-21998/3 PC **A06**/MF **A01**
Lockheed Engineering and Management Services Co., Inc., Houston, TX.
As Built Design Specification for CLASSY, an Adaptive Maximum Likelihood Clustering Method.
C. L. Horton, and R. K. Lennington. Feb 80, 101p NASA-CR-160562, JSC-16486
Contract NAS9-15800

The latest modifications to the CLASSY system and the associate postprocessor MAXLABEL are described. Software and hardware descriptions, control card modifications, and sample executions are given.

N80-21999/1 PC **A03**/MF **A01**
Axiomatix, Los Angeles, CA.
Evaluation of Ku-Band Spa and EA-1 Software, Task No. 2.
Interim Report.
J. Dobbs. 20 Mar 80, 49p NASA-CR-160559, R8003-2
Contract NAS9-15795A

The software for selected space shuttle components are examined for potential problem areas and possible suboptimal coding techniques. Errors discovered in the procedure termination routine are discussed. The technique used to store status flags is found not to be as efficient as possible, from both the standpoints of memory usage and processing time. Self-test routines are examined with the intent of providing a more detailed description of multiplexer/demultiplexer and display and control outputs. An example of a reconfiguration is presented with a block diagram to indicate the critical paths. A cross-reference table of status flags is given to aid in tracing the functional activity of software modules.

N80-22000/7 PC **A03**/MF **A01**
Aerospace Corp., El Segundo, CA.
Reliability Measurement for Operational Avionics Software.
Final Report.
J. Thacker, and F. Ovadia. Sep 79, 40p NASA-CR-159224, ATR-79(7590)-2
Contract NAS1-14392

Quantitative measures of reliability for operational software in embedded avionics computer systems are presented. Analysis is carried out on data collected during flight testing and from both static and dynamic simulation testing. Failure rate is found to be a useful statistic for estimating software quality and recognizing reliability trends during the operational phase of software development.

ORNL/TM-7021 PC **E02**/MF **E02**
Oak Ridge National Lab., TN.
User's Guide to Program GFTMOV: a Computer Program to Access and Format a GIFTS 4B UDB into a Data Base for the MOVIE. BYU Program.
W. H. Gray. Jan 80, 54p
Contract W-7405-ENG-26

A program, GFTMOV, that formats data obtained from a GIFTS version 4B Unified Data Base (UDB) into a form suitable for MOVIE.BYU is described. Three sample problems are presented, as well as a discussion of the FORTRAN program. 18 figures, 2 tables. (ERA citation 05:012681)

PAT-APPL-6-128 230 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Memory-Based Parallel Data Output Controller.
Patent Application,
R. J. Stattel, and J. K. Niswander. Filed 8 Mar 80, 20p N80-21987/6, NASA-CASE-GSC-12447-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A memory-based parallel data output controller which employs associative memories and memory mapping to decommutate multiple channels of telemetry data is described. The output controller contains a random access memory (RAM) addressed by a word counter which outputs an encoded peripheral device number and a most/least significant bit (MSB/LSB)-first flag. The device number and a bit counter address a second RAM which contains START and STOP flags to pick out the required bits. The MSB/LSB, START and STOP flags, and the serial input data go to a control block which selectively fills a shift register used to drive the parallel data output bus. A strobe pulse enables a decoder to select the appropriate peripheral device. A microcomputer connected to an address bus can be used to set the contents of the RAMs via multiplexers using the technique of memory mapping.

PB80-174444 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Natural Resource Economics Div.
Using the Isumodel Remote Access System,
Paul Fuglestad, and Klaus Alt. Nov 79, 50p

This paper describes an interactive computer program which allows direct access to one version of the National Linear programming models on line at the Iowa State University computer. The user can enter changes in crop yields or production costs and obtain a solution to the revised model with a summary which can be printed at his remote terminal. The system lends itself to quick studies of the impact of exogenous changes in crop production possibilities, such as impacts of droughts, restraints on fertilizers or pesticides and the like.

PB80-175953 PC **E03**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
Harris Corporation, Harris COBOL Version 07C, Harris Series S-500 and S-800.
Validation summary rept.
29 Feb 80, 56p CCVS74-VSR500

The Validation Summary Report (VSR) for the Harris 100/500/800 Series Cobol Compiler Version 07C (VULCAN Version 07C) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 Cobol Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the low-intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies be level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB80-176902 PC **A03**/MF **A01**
Software Management Consultants, Torrance, CA.
Software Tool Taxonomy Annotated Bibliography.
Special rept.,
Donald J. Reifer, and Harold A. Montgomery. 1 Dec 79, 38p SMC-SOH-79-0001, NBS-GCR-80-199
Contract NB79-SBCA-0273
Prepared in cooperation with SoHaR, Inc., Los Angeles, CA.

The report covers the results of a literature search conducted to identify source material useful in the development of a software tool taxonomy. The findings are organized into three parts. Part 1 summarizes twelve articles which deal with taxonomies. Each article is abstracted and evaluated in terms of its strengths and weaknesses. Part 2 provides an annotated bibliography of thirty articles which survey, compare and/or report experience with tools. Part 3 lists 197 references which were reviewed during the investigation.

PB80-177645 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
Computer Science and Technology: Application of Measurement Criteria in the Selection of Interactive Computer Services.
Final rept.,
Paul D. Amer. Apr 80, 95p NBS-SP-500-58
Library of Congress catalog card no. 80-600035.

This publication addresses the data analysis component of the computer service selection process. A computer service selection model is presented and three binary type selection procedures applicable in the measurement phases of that model are given. A binary type procedure determines which of a set of competing computer services perform above and which perform below a specified performance level. As a result of employing these procedures, those services that perform below the performance level can be eliminated or penalized depending on whether the performance specification is mandatory or desirable in nature. The procedures explicitly specify prior to measurement an appropriate selection rule and/or the number of test measurements required in a comparison effort to attain a given level of statistical confidence in the results. Data from a previous case study are reanalyzed to illustrate application of the selection procedures.

PB80-183833 PC **A05**/MF **A01**
Maryland Univ., College Park. Dept. of Computer Science.
Computer Science and Technology: Data Abstraction, Databases, and Conceptual Modeling: An Annotated Bibliography.
Final rept.,
Michael L. Brodie. May 80, 91p NBS/SP-500-59
Library of Congress catalog card no. 80-600052.

This bibliography contains entries for over 350 books, articles, and papers on issues within the

area of conceptual modelling of dynamic systems of complex data. The entries have been drawn from recent work in the areas of database management, programming languages, artificial intelligence, and software engineering. The bibliography has two purposes: to present a comprehensive list of annotated references to research into issues of data abstraction, databases, and conceptual modelling: and second, to encourage the crossfertilization of the three research areas of database management, programming languages, and artificial intelligence.

PB80-810633 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Software Standards. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Brian Carrigan. May 80, 250p
Supersedes NTIS/PS-79/0571 and NTIS/PS-78/0541.

Standards for the design and development of computer software are cited. Compiler standards, programming language standards, and program development standards are included. (This updated bibliography contains 244 abstracts, 41 of which are new entries to the previous edition.)

PB80-810658 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Software Transferability and Portability. 1970-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-Apr 80,
Brian Carrigan. May 80, 106p
Supersedes NTIS/PS-79/0567 and NTIS/PS-78/0552.

Reports are cited which discuss problems and experience gained in transferring computer software from one computer to a different computer. The reports include instructions on converting a software package from one environment to another. Advantages and disadvantages of portable software are cited. (This updated bibliography contains 100 abstracts, 12 of which are new entries to the previous edition.)

SAND-80-0180 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Implicitly Defined Output Points for Solutions of ODEs.
K. L. Hiebert, and L. F. Shampine. Feb 80, 24p
Contract EY-76-C-04-0789

The solution of the initial-value problem for a system of ordinary differential equations (ODEs) is a very common task for which there exists a variety of high-quality mathematical software. Such a problem may be accompanied by a set of constraint functions. The task is then to locate the first x for which some constraint function has a root, and to produce solution values there. This task can arise from the desire for a table of the solution with increments taken in one of the dependent variables. There has been relatively little attention given to the task considered. This report briefly surveys the work that has been done. The difficulty of the task has been grossly underestimated. There are also some significant software difficulties that are not generally appreciated. These matters are addressed, and some solutions of varying degrees of generality are proposed. A new method for handling interpolation in a Runge-Kutta code like the popular RKF45 is made. Modifications were made to RKF45, and a few results with this code are reported. (ERA citation 05:017296)

SLAC-PUB-2456 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Babel of Application Development Tools.
J. R. Ehrman. Jan 80, 20p CONF-7910127-1
Contract EY-76-C-03-0515
SHARE-GUIDE-IBM application development symposium, Monterey, CA, USA, 15 Oct 1979.

A major barrier to achieving productivity in the development of all programing applications is the poor quality and excessive number of tools that must be used to get the job done. Most attempts to find, measure, and eliminate productivity bottlenecks have focused on only one of these tools, namely high-level languages. An example of such an attempt is the recent concern with structural programing. It is the thesis of this presentation that, in order to produce even a simple program, a programer must know on the order of a dozen distinct languages. These languages are incompatible, have idiosyncratic syntaxes and mediocre diagnostics, and are often the biggest stumbling blocks in the way of rapid program development. A simple programing example is used to illustrate these points. 26 figures. (ERA citation 05:017299)

UCRL-84015 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Raster Generation in the Array Processor: Trials and Traumas.
N. Maron, and T. A. Brengle. 25 Feb 80, 10p CONF-800415-1
Contract W-7405-ENG-48
Annual FPS Users' conference, San Francisco, CA, USA, 28 Apr 1980.

Methods developed to handle bit manipulation on the FPS Array Processor 38-bit main data memory and the problems and successes in converting vector graphics data to raster data are discussed. (ERA citation 05:017306)

9C. Electrical and Electronic Engineering

AD-A083 499/4 PC **A03**/MF **A01**
Westinghouse Research and Development Center Pittsburgh PA
Theory and Design of Electrical Rotating Machinery.
Final rept. 1 May 72-31 Oct 79,
W. J. Carr, Jr. Apr 80, 50p
Contract N00014-72-C-0432

The objective of this program was to contribute toward new and improved rotating machines for Naval applications, with emphasis on superconducting machinery. Work has been performed on the theory of ac losses in multifilament superconductors and experiments were made to check the theory. A list of publications and abstracts of scientific papers published under the contract is given, and a review is given of the theory of losses. A macroscopic theory for superconductivity in multifilament superconductors was developed, and the theory was used to calculate the hysteresis and eddy current losses which occur in the presence of changing magnetic fields. Both the transverse field and the longitudinal field cases were considered, and also the self-field loss of an alternating transport current, along with some examples of the combined loss due to alternating applied field and transport current. The results are useful for the design of superconducting devices, such as superconducting motors and generators. A small amount of additional work was done on studies of novel homo- and heteropolar motors.

AD-A083 587/6 PC **A02**/MF **A01**
IBM Thomas J Watson Research Center Yorktown Heights NY
Multistep and One-Leg Methods for Implicit Mixed Differential Algebraic Systems.
Werner Liniger. 15 Jan 79, 10p AFOSR-TR-80-0318
Contract F49620-77-C-0088
Pub. in IEEE Transactions on Circuits and Systems, vCAS-26 n9 p755-762 Sep 79.

No abstract available.

BDX-613-2376 PC **A04**/MF **A01**
Bendix Corp., Kansas City, MO.
Mathematical Model and the Dynamic Simulation of an Electromechanical Rotary Device.
J. D. Emergy. Feb 80, 65p
Contract EY-76-C-04-0613

A mathematical model of an electro-mechanical rotary device is presented. This device contains a rotor, stator, and two spring-loaded arms which restrict the rotor motion. The desired action is the alignment of the rotor and the consequent movement of the arms. The SLENOID computer program for calculating the magnetic torque, air gap permeance, spring torque, damping effects, and motion of the rotor and arms is described. (ERA citation 05:014008)

CONF-7808114- PC **A04**/MF **A01**
Argonne National Lab., IL.
Proceedings of the Workshop on Meteorological Effects of Satellite Power System Rectenna Operation and Related Microwave Transmission Problems.
J. Lee. Dec 79, 58p
Contract W-31-109-ENG-38
Workshop on meteorological effects of satellite power systems rectenna operation and related microwave transmission problems, Rosemont, IL, USA, 23 Aug 1978.

Discussion at the workshop concentrated on the effects of the Satellite Power System (SPS) on the atmosphere and the effects of the atmosphere on the SPS microwave beam propagation. The three main concerns were the effects on the atmosphere of the estimated 750 MW excess heat released at the SPS rectenna site, the microwave interactions with the atmosphere, possibly causing loss of beam control and scattering of beam energy, and the possible effects of the beam on atmospheric electrification processes. Construction of a rectenna will modify the thermal and radiative properties of the ground, and operations will introduce a heat source at the surface. It was generally agreed that the direct effects of any single causes due to an SPS in the lower atmosphere will be small but detectable in some instances, and that their combined effects need better definition. Variations in the refractive index of the atmosphere and the presence of hydrometeors in the atmosphere cause refraction, scattering, and adsorption of electromagnetic waves. Refractive-index anomalies in the atmosphere may impact on power beam control. The effect of the rectenna waste heat may be studied on two scales: the mesoscale (regional and city sizes, 10 to 100 km) and the cloud scale (10 km and less). At 2.45 GHz the refractive index of air at fixed pressure depends mostly on water vapor and temperature. In the presence of convective or turbulent air motions a spectrum of atmospheric refractivity develops. These variations can lead to beam wandering and spreading. Direct interactions with the atmospheric electricity fields are not thought to be crucial at the 2.45 GHz frequency. However, the mere physical presence of the rectenna might have some modifying influence on the occurrence and electrical behavior of thunderstorms over and around the rectenna. (ERA citation 05:015122)

N80-21695/5 PC **A03**/MF **A01**
National Centre of Tribology, Risley (England). European Space Tribology Lab.
Thermal Vacuum Qualification and Accelerated Life Tests on a British Aerospace Dynics Group Modified Ots Drive (Mod Bapta).
K. Parker. Aug 79, 26p ESA-CR(P)-1269
Contract ESA-2584/75-MD

The thermal vacuum qualification and accelerated life tests on a modified bearing and power transfer assembly (MOC BAPTA) are discussed. The modified BAPTA was operated at one revolution per hour for short periods under several thermal conditions. Two eclipse simulations were carried out with a rotational speed of one revolution per day. The accelerated life tests simulated approximately 10 years of real time operation in a geostationary satellite at two thermal conditions. During both tests, the motor operated satisfactorily with no evidence of irregularities in the stepping motion. During the qualification test, a small increase in electrical noise was observed for increasing slip ring current, and a significant reduction in this parameter occurred during the first thermal condition of the accelerated life test.

PB80-170798 PC **A09**/MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Electrical Engineering.
Hierarchical Control of Interconnected Power Systems.
Final technical rept.,
Mohamed Omar Mansour. Aug 75, 197p TR-EE-75-34, NSF-RA-N-75-487
Grants NSF-GI-38315, NSF-AER75-19711

This study deals with the application of hierarchical theory to large interconnected power system con-

trol problems. Specifically, small system disturbances which should provide insight into cases of large system disturbances are investigated. The hierarchical control approach, coordination principles and advantages are described together with application of the coordination balance principle to stabilize power system oscillations for both unit and area control. The approach considers the decomposition of a system into subsystems forming a hierarchical structure thereby constituting a method of dealing with complexity. The subsystems are coordinated in such a way as to obtain original system objectives. Linearized power system applications are investigated in which dynamic stability is measured by the real parts of eigenvalues. The hierarchical coordinators transfer function parameters can be selected so that the system's dominant eigenvalues are shifted optimally to the left of the vertical axis. A method has been developed which uses eigenvalue sensitivities and linear programming to achieve this optimum eigenvalue shift.

PB80-170863 PC **A08/MF A01**
Purdue Electric Power Center, Lafayette, IN.
Transient Security Assessment of Power Systems by Pattern Recognition and Liapunov's Direct Method.
Final rept.,
Chhote Lal Gupta. Aug 76, 175p PCTR-27-76, TR-EE76-35, NSF/RA-761845
Grant NSF-AER75-19711

Two different methods are described for the on-line assessment of transient security evaluation of power system operation. Several improvements were made in transient security evaluation by Liapunov's direct method which treats the difficulty of determining the stability region around the post-fault equilibrium point. An algorithm was developed to overcome this problem. Examples highlight the salient points of the algorithm and emphasize the promising potentials of this approach. Pattern recognition, a relatively new concept, provides an alternative to Liapunov's method. In pattern recognition, feature recognition is difficult because of the high dimensions of power systems. Two concepts have been developed for feature selection. The first approach is purely statistical and feature selection is achieved by principal component analysis of the sample vector. Results obtained are considerably better than those previously reported. The second approach is a pragmatic one whereby an understanding of system behavior is applied to obtain effective features. A simple piecewise linear classifier provides better than 98 percent correct recognition.

9D. Information Theory

AD-A083 103/2 PC **A02/MF A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
A Filter for Separating Time-Limited Modal Signals,
A. E. Pearson, and J. M. Mocenigo. 1 Nov 78, 9p AFOSR-TR-80-0265
Grants AFOSR-75-2793, NSF-ENG78-25828
Pub. in IEEE Transactions on Automatic Control, vAC-24 n6 p926-932 Dec 79.

No abstract available.

AD-A083 355/8 PC **A14/MF A01**
Foreign Technology Div Wright-Patterson AFB OH
Methods of Interference-Free Reception of Frequency Modulated and Phase Modulated Signals,
A. S. Vinitskii. 23 Aug 79, 318p Rept no. FTD-ID(RS)T-0232-79
Edited trans. of mono. Metody Pomekhoustochivogo Priyema ChM i PM Signalov, Moscow, 1968 p1-253, by G. Edwards.

No abstract available.

N80-21826/6 PC **A03/MF A01**
International Inst. for Aerial Survey and Earth Sciences, Enschede (Netherlands).
An Evaluation of Spectral- and Intensity-Data Compression Methods.
N. J. Mulder, and N. Donker. May 79, 37p ITC-79/05/N/MU, ESA-CR(P)-1276
Contract ESA-3601/78-NL-HP(SC)
Original Contains Color Illustrations.

The results of an evaluation of data compression applied to Landsat-MSS data are presented. Of the methods tested, the older method of a KL-transform in the spectral domain, followed by clustering on hisrogram criteria on Principal Components 1 and 2 was chosen because it allows a clear distinction of spectral domain transforms and intensity domain transforms as two separate methods. An evaluation based on technical considerations is complemented by a visual interpretation by an experienced photo intepretor. Results are: (1) the spectral domain KL-transform does preserve all essential information even if the parameters are not optimal, per line KL-transform can be replaced by a fixed KL-transform for the frame; (2) clustering destroys most essential informaton, in particular PC 2 is hurt, and (3) using the Specht non parametric classification method (Sigma), the results on fixed PC is relatively the best, but only just acceptable for the user and then only for very coarse classification.

9E. Subsystems

AD-A083 041/4 PC **E20**
IIT Research Inst Rome NY
Microcircuit Device Reliability Hybrid Circuit Data, Winter 1979/1980,
Steven J. Flint. Jan 80, 304p RAC-MDR-14
Contract F30602-78-C-0281
Availability: National Technical Information Service, Springfield, VA 22161. PC$60.50 (No copies furnished by DTIC). Microfiche copies only.

This compendium of Hybrid Microcircuit Reliability Data contains both detailed and summarized information. The detailed data have been collected from both military and commercial applications and consist of field experience, reliability demonstration results, screening fallout, life tests, and equipment check-out results. A full description of the construction of each device as well as the manufacturer and all test parameters have been included. The summarized data show the distribution of failure causas for hybrids subjected to various conditions, failure rates of components used within hybrids, the screening fallout distributions and a comparison between field data and MIL-HDBK-217 predictions. (Author)

AD-A083 226/1 PC **A05/MF A01**
Ohio State Univ Columbus Electroscience Lab
A Cavity-Type Broadband Antenna with a Steerable Cardioid Pattern.
Final rept.,
B. A. Munk, and C. J. Larson. Dec 79, 92p Rept no. ESL-711559-2

This report describes a new vertically polarized cavity-type antenna with a cardioid pattern steerable in the horizontal plane. The front-to-back ratio is better than 15 dB over a 25% bandwidth and better than 20 dB within half that total bandwidth. The average gain is approximately 2 dB above a monopole and the VSWR<2 except at the very end of the band. The beamwidth in the front as well as the nullwidth in the back is so wide that the beam is directed only in the four cardinal directions in the horizontal plane. A working model will be delivered to NRL as part of the contract. (Author)

AD-A083 259/2 Not available NTIS
Toronto Univ (Ontario) Dept of Electrical Engineering
A V-Groove Oxide Isolated Bipolar Bucket Brigade Shift Register,
F. E. Holmes, and C. A. T. Salama. 16 Jan 74, 9p DRB-REPRINT-4092
Availability: Pub. in Solid-State Electronics, v17 p1193-1200 1974 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 322/8 PC **A03/MF A01**
Air Force Avionics Lab Wright-Patterson AFB OH
The Application of Integrated Optics to Computing.
Final rept.,
Douglas A. Wille. Jan 80, 31p Rept no. AFAL-TR-79-1196

Recent developments in bistable optical devices and residue arithmetic processing have shown there is a significant potential application of optics to computing. The ability to perform these functions using integrated optics provides the capability for providing a high device density and enhances the application to computing. An introduction to bistable optical devices and residue arithmetic is provided and the fundamental limit to optical computing set by thermal problems is addressed. It is concluded that the limits previously proposed are not applicable and thermal loss can potentially be very low. (Author)

AD-A083 391/3 PC **A03/MF A01**
Naval Research Lab Washington DC
Nonlinear Spectral Analysis and Adaptive Array Superresolution Techniques.
Interim rept.,
William F. Gabriel. 1 Feb 80, 28p NRL-8345, AD-E000 390

Two nonlinear spectral analysis techniques, the Burg maximum entropy method and the maximum likelihood method, are related to their similar nonlinear adaptive array antenna counterparts, which consist of the sidelobe canceller and directional gain constraint techniques. The comparison analysis permits an examination of their principles of operation from the antenna spatial pattern viewpoint, and helps to qualify their superresolution performance. The real-time adaptive resolution of two incoherent sources located within a beamwidth was simulated, and results are presented in the form of a universal superresolution curve over a SNR range of 0 to 40 dB. Two alternative adaptive spatial spectrum estimators are suggested, consisting of a circular array predicting to its center point, and a new 'thermal noise' algorithm. (Author)

AD-A083 489/5 PC **A02/MF A01**
Philips Labs Briarcliff Manor NY
Development of an Electrophoretic Image Display.
Quarterly technical rept. no. 1, 1 Aug-31 Oct 79,
Richard Liebert, and Joseph Lalak. Nov 79, 17p
Contract MDA903-79-C-0439, DARPA Order-3802

The purpose of this work is to develop a 350 x 600 element X-Y addressed electrophoretic image display (EPID). The design and fabrication of a control-grid electrode supported by a Mylar dielectric has been investigated. Computer modeling is being used as a design aid, and ion-beam milling has been successfully used to fabricate the Mylar control-grid electrode. The Mylar dielectric is attached to the In2O3 coated substrate using heat and pressure alone or in combination with an epoxy adhesion promoter. Good seals, with occasional nonbonded areas, were obtained by heating the Mylar while applying pressure. Better seals were obtained when one side of the Mylar was coated with epoxy. Operating life-test results indicate no adverse interactions between the electrophoretic suspension and the Mylar/epoxy seal. Computer modeling of the electrostatic potential in the device is in progress. (Author)

AD-A083 490/3 PC **A02/MF A01**
Philips Labs Briarcliff Manor NY
Development of an Electrophoretic Image Display.
Quarterly technical rept. no. 2, 1 Nov 79-31 Jan 80,
Richard Liebert, and Joseph Lalak. Mar 80, 25p
Contract MDA903-79-C-0439, DARPA ORDER-3802

The size of the ion-beam milled control-grid structure was increased to 2.0 in. x 2.6 in. (from 0.75 in. x 0.75 in.); the diameter of the uniform area is 2.7 in. Fabrication techniques for this larger size are being developed. The design of a working display is nearly complete. Using the results of the computer model, the dimensions of the display were chosen. The potential wells will be 30 micrometers x 102 micrometers with 6 micrometers wide walls. The maximum separation between electrodes will be 62 micrometers, and the wells with be 12 micrometers deep. The display will have 16 rows of 32 characters in a 5 x 7 dot matrix font with a resolution of 2 1p/mm. The active area will be 2.22 in. x 1.43. in and contain 32,224 pixels. It was decided to use In2O3 as the material for the grid electrode

instead of aluminum; deposition of the In2O3 will begin as soon as the sputtering system is modified. (Author)

AD-A083 613/0 PC **A11/MF A01**
Westinghouse Defense and Electronic Systems Center Baltimore MD Systems Development Div
GaAs Monolithic Microwave Subsystem Technology Base.
Technical rept. 30 Sep 78-30 Sep 79,
J. G. Oakes, and J. E. Degenford. Jan 80, 242p
Rept no. 80-0077
Contract N00014-78-C-0268, DARPA Order-3543

During the period covered by this report, a number of decisions on GaAs material growth and processing, improvements in device design, and changes in device and circuit fabrication were made. In addition, all of the required processing fabrication and measurement equipment has become fully operational. The above, in turn, have resulted in: (1) increased yields of FET devices, (2) more uniform DC and RF characteristics, (3) improved FET performance as demonstrated by substantially higher output power per unit of gate width and higher power added efficiency, and (4) a faster program pace as manifested by more device and monolithic circuit processing runs per unit time. The benefits of the Melbourn Liquid Encapsulated Czochralski facility are becoming evident as large diameter, low impurity GaAs boules grown in pyrolitic boron nitride crucibles are available and being used in this program. Measurements of mobilities have shown values close to the theoretical limit for the case of a zero background impurity level, i.e.; a mobility of 5500 for n = 5x 10 to the 16th power.

N80-21624/5 PC **A04/MF A01**
TRW Systems Group, Redondo Beach, CA.
Study of Advanced Sunflower Precision Deployable Antenna.
Final Report.
M. M. Giebler, and W. B. Palmer. 21 Nov 79, 67p
NASA-CR-162631, MEL-79-B-126
Contracts NAS7-100, JPL-955340
Prepared for JPL.

The maximum deployed diameter stowable in shuttle was determined for the original concept and for new more efficient concepts. Estimates of weight, surface accuracy and cost were made for the various configurations. Five critical technologies were identified which would be required to manufacture large solid deployable reflectors. These technologies are concerned with surface accuracy improvement and verification.

N80-21662/5 PC **A05/MF A01**
Instituto Nacional de Tecnica Aeroespacial, Esteban Terradas, Torrejon de Ardoz (Spain).
S Band Low Gain Antenna PQM Manufacturing and Test.
Final Report.
J. Torres, P. Pinto, F. Villa, and V. Tato. Jul 79, 78p SB/AE/322-FR, ESA-CR(P)-1280
Contract ESTEC-3304/77-NL-AK

The development and testing are reported of a prequalification model of an S Band TT and C antenna which will meet the mechanical and environmental requirements of a TRICA specification. The specification is given for both an isolated and a spacecraft mounted antenna, followed by a description of fabrication techniques, testing procedures, and design optimization possibilities. Test records are provided, along with the fabrication procedures for a microwave stripline. The possibility of a resonant ring breakdown is investigated.

PAT-APPL-6-000 740 PC **A02/MF A01**
Department of Energy, Washington, DC.
High-Voltage Crowbar Circuit with Cascade-Triggered Series Ignitrons.
Patent Application,
W. R. Baker. Filed 3 Jan 79, 12p
Contract W-7405-ENG-48
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A series string of ignitrons for switching a large current at high voltage to ground is discussed. Switching is initiated by means of a negative trigger pulse applied to the cathode of the lowest voltage level ignitron next to ground to draw ground current through diodes in the ignitor circuit. The trigger pulse is applied thereby to the next higher ignitron cathode and sequentially to the remainder of the ignitrons in the string through diodes in respective ignitor circuits. Full line voltage is held off of nonconducting diodes and ignitrons by means of varistors. (ERA citation 05:021097)

PAT-APPL-6-047 449 PC **A02/MF A01**
Department of Energy, Washington, DC.
Apparatus for Generating Nonlinear Pulse Patterns.
Patent Application,
N. M. I. Nakamura. Filed 11 Jun 79, 20p
Contract W-7405-ENG-48
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Apparatus for generating a plurality of nonlinear pulse patterns from a single linear pulse pattern. A first counter counts the pulses of the linear pulse pattern and a second counter counts the pulses of the nonlinear pulse pattern. A comparator compares the counts of both counters, and in response to an equal count, a gate is enabled to gate a pulse of the linear pattern as a pulse of the nonlinear pattern, the latter also resetting the first counter. Presettable dividers divide the pulses of each pattern before they are counted by the respective counters. Apparatus for generating a logarithmic pulse pattern from a linear pulse pattern to any log base is described. In one embodiment, a shift register is used in place of the second counter to be clocked by each pulse of the logarithmic pattern to generate the pattern. In another embodiment, a memory stores the logarithmic pattern and is addressed by the second counter which is clocked by the pulses of the logarithmic pulse pattern. (ERA citation 05:021099)

PAT-APPL-6-129 793 PC **A02/MF A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Microwave Switching Power Divider.
Patent Application,
R. J. Stockton. Filed 12 Mar 80, 24p N80-21670/8, NASA-CASE-GSC-12420-1
Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A microwave switching power divider for selectively dividing and switching microwave energy among a plurality of outputs to antenna elements or other microwave devices such as filters, phase-shifters or other networks is disclosed. The power divider includes a pair of parallel, spaced-apart circular ground planes defining a microwave cavity with multi-port microwave power distributing switching circuitry formed on opposite sides of a thin circular dielectric substrate disposed between the ground planes. The power distributing circuitry includes a conductive disk located at the center of the substrate and connected to a source of microwave energy. Microwave energy propagates as standing waves within the cavity. A plurality of radial power dividing transmission lines for intercepting the standing waves are symmetrically disposed about and connected to the conductive disk.

PB80-170228 Not available NTIS
National Bureau of Standards, Washington, DC.
Status Report: A Standard Method for Determining the Efficacy of Fluorescent X-Ray Intensifying Screens.
Final rept.,
R. C. Placious, E. Moser, R. S. Holland, and F. Masi. 1979, 3p
Pub. in Proceedings of SPIE/SPSE Application of Optical Instrumentation in Medicine (VI), Boston, MA, September 25-27, 1977, Jnl. of Applied Photographic Engineering 5, p157-159 1979.

A proposed ANSI standard for classifying radiographic intensifying screens has been under test at the National Bureau of Standards. This standard establishes procedures for characterizing, on an absolute basis, the optical spectral output of fluorescent screens per unit of incident x-ray exposure. The testing procedure has undergone revision since an earlier status report was given. Calcium tungstate screens, however, still form the basis of comparison in this procedure because of the long acceptability and stable output qualities of this screen. The nature of the revisions and current output data on the screens will be described.

SAND-79-2092C PC **A02/MF A01**
Sandia Labs., Albuquerque, NM.
Performance of Digital Integrated Circuit Technologies at Very High Temperatures.
J. L. Prince, B. L. Draper, E. A. Rapp, J. N. Kromberg, and L. T. Fitch. 1980, 10p CONF-800410-2
Contract EY-76-C-04-0789
Electronic component conference, San Francisco, CA, USA, 28 Apr 1980.

Results of investigations of the performance and reliability of digital bipolar and CMOS integrated circuits over the 25 to 340 exp 0 C range are reported. Included in these results are both parametric variation information and analysis of the functional failure mechanisms. Although most of the work was done using commercially available circuits (TTL and CMOS) and test chips from commercially compatible processes, some results of experimental simulations of dielectrically isolated CMOS are also discussed. It was found that commercial Schottky clamped TTL, and dielectrically isolated, low power Schottky-clamped TTL, functioned to junction temperatures in excess of 325 exp 0 C. Standard gold doped TTL functioned only to 250 exp 0 C, while commercial, isolated I exp 2 L functioned to the range 250 exp 0 C to 275 exp 0 C. Commercial junction isolated CMOS, buffered and unbuffered, functioned to the range 280 exp 0 C to 310 exp 0 C exp + , depending on the manufacturer. Experimental simulations of simple dielectrically isolated CMOS integrated circuits, fabricated with heavier doping levels than normal, functioned to temperatures in excess of 340 exp 0 C. High temperature life testing of experimental, silicone-encapsulated simple TTL and CMOS integrated circuits have shown no obvious life limiting problems to date. No barrier to reliable functionality of TTL bipolar or CMOS integrated ciruits at temperatures in excess of 300 exp 0 C has been found. (ERA citation 05:016413)

UCID-18533 PC **E06/MF E08**
California Univ., Livermore. Lawrence Livermore Lab.
DASLL (Design Automation System at Lawrence Livermore Laboratory): System Reference Manual.
W. G. Magnuson, Jr., and G. W. Willett. Dec 79, 25p
Contract W-7405-ENG-48

DASLL stands for Design Automation System at Lawrence Livermore Laboratory, and is a set of computer programs for the laying out of electronic printed circuit boards. This report complements other documenation and provides information for a programer or DA specialist who wishes to learn more about DASLL, maintain the system, or install it on another computer system. The DASLL system structure is described together with brief descriptions of the data base and internal file structures. Included also on microfiche is a complete program listing with extensive comments. (ERA citation 05:014040)

9F. Telemetry

PAT-APPL-6-028 741 PC **A02/MF A01**
Department of Energy, Washington, DC.
Multiplexer and Time Duration Measuring Circuit.
Patent Application,
J. Gray, Jr. Filed 10 Apr 79, 8p
Contract W-31-109-ENG-38
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A multiplexer device is provided for multiplexing data from a plurality of pulse sources to a master storage and includes a D type flip-flop. (ERA citation 05:021098)

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

ALO-35356-1 PC A04/MF A01
Monsanto Research Corp., Dayton, OH.
Superior Heat Transfer Fluids for Solar Heating and Cooling Applications. Semiannual Report, 20 August 1978-20 February 1979.
L. Parts, D. R. Miller, and Q. E. Thompson. Sep 79, 55p MRC-DA-904
Contract EM-78-C-04-5356

The objectives of this program are: (1) to quantify the required design and handling properties of heat transfer fluids for solar collector applications, (2) to collect data and pertinent information for all fluids presently used or envisioned as potentially useful in solar energy applications, based on the current state of the art, and (3) to organize the latter information to allow the designers of solar collection systems to select optimum fluids for their particular needs. Two broad surveys have been conducted. One encompassed the designers and manufacturers of solar collectors and collection systems to establish the data base for the required fluids properties. The results of this survey are summarized in this report. The second survey was addressed to the manufacturers of heat transfer fluids. A list of commercially available heat transfer fluids, to which further additions are anticipated, is also included. (ERA citation 05:013378)

ALO-5355-T1 PC A04/MF A01
Sperry Univac, St. Paul, MN.
Solar Collector Studies for Solar Heating and Cooling Applications. Six Month Technical Progress Report, September 18, 1978-March 18, 1979.
S. O. Jensen, J. E. Kovacic, and J. H. Anderson. Mar 79, 56p
Contract EM-78-C-04-5355

A summary of the literature, especially patent teachings pertaining to black fluid solar collectors is given. Laboratory tests to determine the suspension stability of various carbon types in water/ethylene glycol are reported. The suspensions were aged at 160 exp 0 F for 2000 hours and at -15 exp 0 F for 500 hours. Tests to date demonstrate that colloidal carbon with Zanflo gum as the suspending agent gave excellent, stable suspensions even after evaporation and resuspension with water/ethylene glycol 50:50 solution. It is suggested that the suspending agent interacts with electrical charges on the carbon particles to prevent agglomeration. (ERA citation 05:015424)

BNL-50939(2ndEd.) PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Normal Incident Solar Radiation Measurements at Upton, New York.
J. G. Cottingham. 23 Aug 79, 14p
Contract EY-76-C-02-0016

Normal incident solar energy measurements made at Upton, L.I., New York, are reported and analyzed relative to the total energy received on a horizontal surface. A new method for estimating normal incident solar radiation is developed and used to determine average values for other east coast locations. (ERA citation 05:011429)

CONF-800111-1 PC A03/MF A01
Oak Ridge National Lab., TN.
Comprehensive Analysis of Critical Interactions Possible.
T. J. Wilbanks. 1980, 39p
Contract W-7405-ENG-26
Annual conference of the American Association for the Advancement of Science, San Francisco, CA, USA, 4 Jan 1980.

In the strictest sense, a comprehensive analysis of interactions having a bearing on energy policy is not now possible, and it may never be. Assuming that policymaking will benefit from developing as much of this capability as possible, this paper identifies the major shortcomings at present and the principal reasons for them. In conclusion, it suggests some strategies for closing the gap. (ERA citation 05:013687)

CONS-0003-T2 PC A06/MF A01
Price Waterhouse and Co., Chicago, IL.
Illinois Energy Conservation Plan: Documentation of DOE-1535-O-A Calculations.
6 Nov 79, 124p
Contract EW-77-G-45-0023

This report presents data compiled on the estimated energy conservation achieved by programs included in the Illinois Energy Conservation Plan. Summaries are given for the following areas: thermal and lighting standards; state and local procurement standards; carpooling, vanpooling, and public transit; right turn on red; energy data information system; Homeowner's Extension Program; agricultural resource applications; Farm Energy Conservation Program; Commercial Industrial Program; Public Utilities Program; School Energy Management Program; energy management assistance to local government; Administration of State Plan; energy conservation information; energy management for state buildings; solar energy; waste to energy and resource recovery; intergovernmental coordination; community technology assistance. (ERA citation 05:012014)

CONS-5007-T1 PC A07/MF A01
Perkin-Elmer Corp., Pomona, CA. Aerospace Div.
Focus on Energy Conservation: A Project List.
Apr 78, 135p
Contract EC-77-C-01-5007

The Urban Land Institute (ULI) has prepared the following list of outstanding energy conserving projects for the US Department of Energy. As requested by the Department, the list includes descriptions of land developments and individual buildings suggested by members of ULI and by other sources. The projects have been selected to exemplify the major energy saving techniques in use today, with emphasis on those strategies most significant for people engaged in the business of land development. To make the list a useful reference for developers and public officials, ULI has attempted to cover energy conservation in the broadest sense from overall site planning to the functioning of individual building components. Focusing too closely on the myriad types of hardware available has been avoided and examples of the basic considerations important to energy-conscious planning and design are provided. Details on some heating, ventilation and air conditioning systems are provided in order to acquaint readers with major innovations in the field. (ERA citation 05:013808)

COO-4521-1 PC A05/MF A01
Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
Variability of Solar Radiation at Four Selected Stations in the United States. Final Report, October 1, 1977-September 30, 1978.
H. W. Shen, and W. C. Wang. Oct 79, 99p
Contract EG-77-S-02-4521

The solar radiations considered are the total of direct and diffuse radiant energies received on a horizontal surface at ground level by a pyranometer during solar hours. Four stations, at Seattle-Tacoma, Washington; Madison, Wisconsin; Charleston, South Carolina; and Albuquerque, New Mexico were selected to represent different climatic conditions across the United States. The data were obtained from the National Climatic Center, Asheville, North Carolina. The data can be fitted by either a normal or gamma distribution and, for simplicity, a normal distribution was used. The coefficients of variation for all stations over the years were relatively low, and in general, were lower for summer months than for winter months. Of the four stations tested, Albuquerque had the lowest coefficients of variation and Seattle-Tacoma had the highest. It was estimated that no more than 16 years of records are needed for any of these stations to estimate a mean value which is within 10% of the true mean. Both the continuous daylight hours of high solar radiation (over 1100 kJ/m exp 2 /hr) and the accumulated hourly solar radiation for these durations were studied. (ERA citation 05:015093)

COO-4643-02 PC A02/MF A01
Solar Environmental Engineering Co., Inc., Fort Collins, CO.
Continuing Regional Solar Energy Information Mini-Center Activities and Updating the SOLCOST Program. Quarterly Report.
L. J. Lantz. Apr 79, 23p
Contract EG-77-C-02-4643

The progress made during this period is reported for each of the following tasks: (1) interactive SOLCOST interface; (2) energy conservation - solar system optimization; (3) detailed duct sizing; (4) extension of SOLCOST data base; (5) portable FORTRAN version; (6) automatic collector parameter subroutine; (7) the solar index; and (8) operation of the SOLCOST mini-center. (ERA citation 05:013350)

COO-4649-8 PC A07/MF A01
Iowa State Univ., Ames. Heat Transfer Lab.
Research Workshop on Energy Conservation Through Enhanced Heat Transfer.
G. H. Junkhan, A. E. Bergles, and R. L. Webb. Oct 79, 134p
Contract ET-78-S-02-4649

Seven papers were presented at the meeting. A separate abstract was prepared for each paper. (ERA citation 05:014033)

COO-4709-T2 PC A05/MF A01
Western Minnesota Municipal Power Agency, Detroit Lakes.
Detroit Lakes Energy Systems Study: Phase I Extension. Final Report, August 1, 1978-January 15, 1979.
31 Jan 79, 100p
Contract ET-78-G-02-4709

An assessment of the resource availability of biomass and the potential of utilization of renewable energy systems in Detroit Lakes, Minnesota is presented. The feasibility of retrofitting the existing power plant to house a biomass energy system is discussed. Survey and evaluation of current off-the-shelf farm implement equipment which can be adapted to the handling of selected biomass materials is presented. Density studies on sunflower stalks, grain straw, and forest residues are included. (ERA citation 05:013504)

DOE/CS/5226-1 PC A06/MF A01
American Inst. of Industrial Engineers, Norcross, GA.
Energy Auditor Training Curriculum.
Oct 79, 124p
Contract EM-78-C-01-5226

The curriculum presented is designed to be used by States in training energy auditors. The curriculum has been prepared to insure that participating individuals are technically competent to plan, implement, and follow-up energy audits. Successful completion of the program satisfies general-qualification requirements for an energy auditor. The core of the training curriculum is the logical sequence of steps that the energy auditor will be experiencing in conducting energy audits and the implementation and monitoring of a comprehensive energy-management program. (ERA citation 05:013823)

DOE/EIA-0147/8-9(78) PC A02/MF A01
Department of Energy, Washington, DC. Energy Information Administration.
Financial Statistics of Electric Utilities and Interstate Natural Gas Pipeline Companies.
Aug 78, 19p

The financial statistics for August 1978 for privately owned electric utilities and interstate natural gas pipeline companies are summarized and tabulated. (ERA citation 05:013713)

DOE/EIA-0184/27 PC A03/MF A01
Department of Energy, Washington, DC.
Estimates of Energy Non-Resource Costs: Energy Taxes and Subsidies. Analysis Report.
Nov 79, 29p

This report establishes quantitative estimates of selected taxes and subsidies that impact the costs of producing and consuming different energy sources. The taxes and subsidies selected for discussion are judged to be unrelated to any direct

valuation of resources used in the production and distribution process, and further, these taxes and subsidies are not applied uniformly to each fuel type. Such lack of uniformity in treatment prevents comparisons of energy costs on a consistent basis. This report presents estimates of each relevant tax ans subsidy program and describes the methodology used to calculate specific impacts on the marginal costs for each fuel type. Results are reported for 1979, 1985, 1990, and 1995 at the national level. The esimates of tax and subsidy impacts can be used in conjunction with the Analysis Reports, Projecting Marginal Energy Costs Using the Mid-Term Energy Forecasting System, and Marginal Costs of Energy in 1979: Estimates by Economic Sector and Fuel Type, to isolate the direct resource costs of alternative energy sources. (ERA citation 05:011992)

DOE/EIA-0207/1 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Office of Consumption Data System.
Single-Family Households: Fuel Oil Inventories and Expenditures. National Interim Energy Consumption Survey.
Dec 79, 24p

This report presents the results of the Energy Information Administration's (EIA) quick-response survey of fuel oil use by single-family households. Two surveys were conducted in August and September 1979 to determine if households were experiencing problems in obtaining fuel oil. The surveys also collected information on the households' expenditures for fuel oil and their conservation activities. 12 tables. (ERA citation 05:012085)

DOE/ER-0040 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Methodology for Assessing Systems Materials Requirements.
D. H. Culver, R. R. Teeter, and W. M. Jamieson.
Jan 80, 45p
Contract W-7405-ENG-92

A potential stumbling block to new system planning and design is imprecise, confusing, or contradictory data regarding materials - their availability and costs. A methodology is now available that removes this barrier by minimizing uncertainties regarding materials availability. Using this methodology, a planner can assess materials requirements more quickly, at lower cost, and with much greater confidence in the results. Developed specifically for energy systems, its potential application is much broader. This methodology and examples of its use are discussed. (ERA citation 05:013790)

DOE/ET/20283-1 PC **A05**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Civil Engineering.
Statistical Models for Wind Characteristics at Potential Wind Energy Conversion Sites. Final Report, September 15, 1977-October 14, 1978.
R. B. Corotis. Jan 79, 86p RLO-2342-79/1
Contract EY-76-S-06-2342

Simple models and guidelines are developed for wind energy site surveys. Probabilistic procedures are employed to assess survey duration, climatological adjustment, and run duration statistics. A climatological adjustment procedure is derived for the enhancement of candidate site data from a reference site with long-term data, and the computation of confidence intervals is shown for existing data and for projected survey durations. The value of the enhancement procedure is diminished because of the sensitivity of the procedures to long-term cross correlations. A simplified run duration model is developed for initial persistence assessment. The model is simply calibrated for each run level from the seasonal mean wind speed at a site. (ERA citation 05:013444)

DOE/ET/20413-1 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY.
Optical Properties of Metallic Surfaces, Small Particles and Composite Coatings for Solar Energy Conversion Applications. Final Technical Report, April 1, 1977-August 31, 1979.
N. W. Ashcroft, R. A. Buhrman, A. J. Sievers, and J. W. Wilkins. Dec 79, 26p
Contract EG-77-S-03-1456

The properties of heterogeneous materials appear to be central to solar energy research. Furthermore, it is becoming clear that materials with heterogeneity of widely varying sorts may be technologically useful, from amorphous films to composites of microcrystallites. A combined theoretical-experimental program to understand the optical properties of heterogeneous materials is described. The primary experimental quantity measured has been the optical response from the visible to the far infrared. The production, structure and optical properties of composite metal-insulator cermet films have been investigated. Using effective medium theories the optical properties were calculated and compared to experimental measurements. Studies of the design of spectrally selective solar energy absorbers using cermet films were made both experimentally and with computer simulations. Composite films were produced by controlled coevaporation of the metal and an insulator. The materials used include Ni, V, Fe, and Pt metals with dielectrics Al sub 2 O sub 3 , SiO sub 2 , MgO and ZrO sub 2 . Some preliminary results on amorphous aluminium are described. Crystalline aluminum has the disadvantage that its reflectance in the visible is smaller than those of some good free electron metals such as silver, which is unsuitable as a front surface reflector because of rapid corrosion. Interband transitions depress the reflectivity of aluminum in the solar spectrum.If these interband transitions could be eliminated and the free electron reflectance of aluminum obtained, a superior reflective coating would result. Experimental results suggest that amorphous aluminum films can be made by impurity stabilization. (ERA citation 05:015433)

DOE/FE-0002/2 PC **A09**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Fossil Energy.
Fossil Energy Program Report. University Activities, 1 October 1977-30 September 1978.
Dec 79, 190p

This document describes the Fossil Energy-supported contract and project activity for FY 1978. The primary thrust of the Program is on coal - especially direct coal combustion and what can be done to increase the environmental acceptability of coal. We are concerned with developing cleaner technologies, and we are working on precombustion cleanup, fluidized-bed combustion, and post-combustion cleanup. Longer range technologies are being developed that will use coal more efficiently; for example, magnetohydrodynamics, fuel cells, and high-temperature turbine utilization. Another priority is the development of a capability to produce synthetic fuels from coal. We are also engaged in a coal mining research and development program that focuses on increased mine productivity and workers' safety through the development of improved technologies. Our activity in the petroleum and gas research areas is intended to complement efforts in the private sector, which are to be further stimulated by new pricing or Federal incentives. Our present enhanced oil recovery efforts represent a shift in emphasis toward longer range, high-technology development projects instead of numerous field demonstrations and tests. The enhanced gas program emphasizes activities to increase our knowledge of the size and economic productivity of the unconventional gas resources. We are also involved in oil shale development, with the major research concentration on in situ retorting. We are continually assessing our program. Total annual funding has increased from $58 million in FY 1973 to $881 million in FY 1979. Fossil Energy is working closely with all parts of the Department of Energy, other appropriate Federal agencies, industry, and universities to insure that we maintain a balanced, aggressive, and responsive program suited to our national needs. (ERA citation 05:014619)

DOE/IR-0055 PC **A08**/MF **A01**
Department of Energy, Washington, DC. Office of Consumer Affairs.
Consumer Protection Issues in Energy: A Guide for Attorneys General. Insulation, Solar, Automobile Device, Home Devices.
Nov 79, 151p

The guide attempts to bring together two important and current issues: energy and consumer protection. Perhaps the most basic consumer-protection issue in the energy area is assuring adequate supplies at adequate prices. It is anticipated, though, that consumers will want to consider new ways to lower energy consumption and cost, and will thus be susceptible to fraudulent energy claims. Information is prepared on insulation, solar, energy-saving devices for the home, and energy-saving devices for the automobile. (ERA citation 05:005855)

DOE/NASA/CR-161339 PC **A03**/MF **A01**
Wyle Labs., Huntsville, AL. Solar Energy Systems Div.
Outdoor Test for Thermal Performance Evaluation of the Owens-Illinois Sunpak SEC-601 (Air) Solar Collector.
Dec 79, 29p
Contract EX-76-A-29-1037

The test procedures used and the test results obtained during the performance of an evaluation test program on the Owens-Illinois Sunpak, model SEC-601, air solar collector under natural outdoor weather conditions are presented. All testing activities were performed on a single module installed on the Marshall Space Flight Center Solar House. The test was performed and the data evaluated according to the methods provided in ASHRAE 93-77 (Method of Testing to Determine the Thermal Performance of Solar Collectors) as applicable to outdoor testing of solar collectors. (ERA citation 05:013383)

DOE/TIC-10216 PC **A04**/MF **A01**
Federal Energy Administration, Washington, DC.
Energy Cost Reduction Program for the Printing Industry.
15 Jul 77, 57p

This handbook presents help for commercial printers to cut the cost of energy in their business establishments. It shows how to recognize and act on energy waste in: interior and security lighting; space heating; air conditioning; process, and general plant maintenance. The distribution of energy use varies widely among printing facilities, but certain conclusions can be drawn. Process energy, generally electricity, typically consumes 30 to 50% of total energy costs in the operation of presses and trimmers, compressed air generation, and production of binders. Lighting is a significant expense, and may consume up to 33% of energy expenses. Heating and air conditioning are seasonal and show the expected climatic variations - from 15 to 38%. Hot water generally represents 1 to 2% of total costs and is usually represented in heating costs. (ERA citation 05:012116)

DSE-2553-79/1 PC **A05**/MF **A01**
South Dakota School of Mines and Technology, Rapid City.
Energy from Humid Air. Final Report.
T. K. Oliver, W. N. Groves, C. L. Gruber, and A. Cheung. Feb 79, 99p
Contract EX-76-C-01-2553

Results to date are presented for a research project which is in progress at the South Dakota School of Mines and Technology. The goal of the research is to find a cost-effective process to convert the energy in humid air into mechanical work, which will be used to drive an electrical generator. The research is being carried out by computer modeling. Results for a natural draft tower show that it is not a cost-effective way to get energy from humid air. Parametric studies are presented for expansion-compression cycles. With suitable conditions, including large amounts of cooling during compression, this cycle has an attractive net work output. To avoid using all the output power to overcome machine losses, it appears necessary to use a one-machine mechanization. The most promising uses vortex flow to achieve the necessary expansion and subsequent compression with cooling. Power output and costs have been estimated for a vortex plant located in Puerto Rico. (ERA citation 05:013487)

EFI-79-42 PC **A04**/MF **A01**
Chicago Univ., IL. Enrico Fermi Inst.
Design and Test of Non-Evacuated Solar Collectors with Compound Parabolic Concentrators.
A. Rabl, J. O'Gallagher, and R. Winston. Jul 79, 60p

Contract EY-76-S-02-2446

The intermediate range of concentration ratios (1.5X-10X) which can be achieved with CPC's without diurnal tracking provides both economic and thermal advantages for solar collector design even when used with non-evacuated absorbers. The present paper summarizes more than 3 years of research on non-evacuated CPC's and reviews measured performance data and critical design considerations. Concentrations in the upper portions of the practical range (e.g. 6X) can provide good efficiency (40% to 50%) in the 100 exp 0 C to 160 exp 0 C temperature range with relatively frequent tilt adjustments (12 to 20 times per year). At lower concentrations (e.g. 3X) performance will still be substantially better than that for a double glazed flat plate collector above about 70 exp 0 C and competitive below, while requiring only semi-annual adjustments for year round operation. In both cases the cost savings associated with inexpensive reflectors, and the optimal coupling to smaller, simple inexpensive absorbers (e.g. tubes, fins, etc.) can be as important an advantage as the improved thermal performance. (ERA citation 05:013384)

EPRI-EA-1231 PC **A04**/MF **A01**
California Univ., Berkeley.
Correction of End Effects in Energy-Planning Models. Final Report.
R. C. Grinold. Nov 79, 55p

End effects are distortions in the outputs of planning models that result from planning over a fixed time span rather than the indefinite future. The report presents and analyzes several ways to mitigate end effects. The qualitative conclusions are tested and confirmed using an energy-planning model. The reduction of end effects allows a model builder to shorten the length of the planning period. This, in turn, can result in considerable savings in computational costs or can allow the model builder to enrich other aspects of the model. (ERA citation 05:011990)

FE-2414-8 PC **A03**/MF **A01**
Wyoming Univ., Laramie. Dept. of Electrical Engineering.
Remote Electromagnetic Sensing of Underground Coal Burns. Final Report, June 1976-July 1978.
E. A. Quincy. Oct 79, 43p
Contract EX-76-S-01-2414

This research program developed an induction sounding system and estimator algorithm for remote determination of the location, shape and size of the reaction zone produced by Underground Coal Gasification. It was field tested in Wyoming at DOE/LETC sites Hanna II, Phase 1 and Hanna II, Phases 2 and 3. Estimates of the volumes of coal gasified compared favorably with that obtained formerly by chemical estimation. However, the burn may have deviated to the side of the gasification wells more than was predicted by chemical instrumentation. Measurements taken repeatedly over a one-year span on one traverse at Hanna II, Phases 2 and 3 show aging characteristics that demonstrate a migration of the conducting anomaly toward the surface. The final system employed horizontal loops with a fixed separation and 0 to 10 kHz bandwidth. Soundings were made in line across the burn site. Psuedo-noise/cross-correlation techniques were employed to effectively combat the noise. The magnitude response at 1 kHz was used in the final statistical fitting of field data to induction models. Wire grid induction models were used to simulate buried metal boxes, cylinders and spheres in a conducting overburden in order to efficiently compute model responses. Box and cylinder responses were shown to be insignificantly different at coal seam depths and spheres proved to be unlikely candidates for fitting field data. The air-earth interface effect was determined to be only of secondary importance. Adding vertical gasification pipes to models did not change responses significantly at coal seam depths. Horizontal gasification pipes were simulated in the field and showed no significant change in responses. (ERA citation 05:014649)

INKA-Conf-78-068-000 PC **A02**/MF **A01**
Deutsche Gesellschaft fuer Mineraloelwissenschaft und Kohlechemie e.V., Hamburg (Germany, F.R.).
26TH DGMK General Meeting in Berlin, October 4-6, 1978.
1978, 18p CONF-7810224-(Absts.)
In German.26. DGMK general meeting, Berlin, F.R. Germany, 4 Oct 1978.
U.S. Sales Only.

The brochure contains the abstracts of the papers read at the 26th general meeting of the Deutsche Gesellschaft fuer Mineraloelwissenschaft und Kohlechemie (DGMK) in Berlin on October 4-6, 1978. (ERA citation 05:014760)

INKA-Conf-78-226-001 PC **A03**/MF **A01**
Technische Univ., Hanover (Germany, F.R.). Inst. fuer Technik in Gartenbau und Landwirtschaft.
Energy from Other Sources.
C. von Zabeltitz. 1978, 34p CONF-7811134-1
In German.Lecture meeting on agriculture and energy, Muenchen, F.R. Germany, 6 Nov 1978.
U.S. Sales Only.

After a survey of the possible non-fossil energy sources in the field of agriculture and horticulture and a list of the main fields of consumption, some examples are given for the use of non-fossil energy sources. Non-fossil energy sources are: solar energy, ambient heat, thermal energy from water, and wind energy. Consumers are: greenhouses, domestic buildings, animal shelters, and agricultural driers. These consumers can be supplied by a combination of energy sources, e.g. solar energy - heat pump. (ERA citation 05:015322)

INKA-Conf-79-377-001 PC **A04**/MF **A01**
Institut fuer Zuckerindustrie, Berlin (Germany, F.R.).
Energy Economics of Evaporation and Drying Processes.
T. Baloh. Jun 79, 65p CONF-7909114-1
In German.Meeting on: Can the amount of energy used in vaporization and drying be reduced, Wuerzburg, F.R. Germany, 17 Sep 1979.
U.S. Sales Only.

After an explanation of the exergy concept and the use of this concept in the examination of the energy economics, evaporation plants and shred wetting in the sugar industry are discussed. A study of a sugar plant, in which vapor compression is used in the evaporation arrangement and in the boiling-station as well as gas turbine in the shred-wetting shows that in the best sugar plant a saving in costs of fuel energy of about 35% is possible. Detailed calculations for a sugar plant are included in the appendix. (ERA citation 05:016052)

JPL-5102-105 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Thermal Power Systems, Advanced Solar Thermal Technology Project: Glass for Solar Concentrator Applications.
F. L. Bouquet. 1 Apr 79, 75p
Contract EX-77-A-29-1060

Materials for highly reflective surfaces for application to solar thermal power systems are treated. The primary consideration is on the use of second-surface glass mirrors with comparison to alternate candidates. Flat, parabolic, and Fresnel lens systems are contenders for solar thermal concentrators of various power requirements. The emphasis in this report is on glass for parabolic reflective surfaces. The technology status and experimental data on glass, metallic and polymeric concentrators are presented. 121 references. (ERA citation 05:015435)

LA-UR-80-357 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
DOE-2 Verification Project: Phase I Results.
S. C. Diamond, and B. D. Hunn. 1980, 7p CONF-800101-5
Contract W-7405-ENG-36
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

A computer program, designated DOE-2 (formerly DOE-1), has been developed to provide architect/engineers with a public domain tool for fast and economic energy analysis of buildings. Los Alamos Scientific Lab. has developed and implemented a program plan to verify DOE-2. Phase I of this plan is an analytical verification of the DOE-2 program as a computational unit rather than as separate algorithms. Work on Phase I of the DOE-2 Verification Project is nearly complete. Results of the crosscheck with ASHRAE loads calculative procedures, as well as the results of a line-by-line check of program constants and flag-setting algorithms, are reported. Also presented are results of empirical tests of the full DOE-2 program, including comparisons with measured energy consumption, and preliminary results of a study of the user interpretation of input data on predicted results. (ERA citation 05:013732)

LBL-10347 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Comparison of Proportional and on/off Collector Loop Control Strategies Using a Dynamic Collector Model.
S. R. Schiller, M. L. Warren, and D. M. Auslander. Jan 80, 22p CONF-800101-11
Contract W-7405-ENG-48
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

Common control strategies used to regulate the flow of liquid through flat-plate solar collectors are discussed and evaluated using a dynamic collector model. Performance of all strategies is compared using different set points, flow rates, insolation levels and patterns (clear and cloudy days), and ambient temperature conditions. The unique characteristic of the dynamic collector model is that it includes the effect of collector capacitance. In general, capacitance has a minimal effect on long term collector performance; however, short term temperature response and the energy-storage capability of the collector capacitance are shown to play significant roles in comparing on/off and proportional controllers. Inclusion of these effects has produced considerably more realistic simulations than any generated by steady-state models. Simulations indicate relative advantages and disadvantages of both types of controllers, conditions under which each performs better, and the importance of pump cycling and controller set points on total energy collection. Results show that the turn-on set point is not always a critical factor in energy collection since the collector stores energy while it is warming up and during cycling; and, that proportional flow controllers provide improved energy collection only during periods of interrupted or very low insolation. Although proportional controllers initiate flow at lower insolation levels than on/off controllers, proportional controllers produce lower flow rates and higher average collector temperatures, resulting in slightly lower instantaneous collection efficiencies. (ERA citation 05:015436)

LBL-9356 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Hospital Energy Audits: A Bibliography.
R. I. Pollack, J. Boe, G. D. Roseme, M. A. Chatigny, and D. D. Devincenzi. Sep 79, 76p
EEB-Hosp-79-3
Contract W-7405-ENG-48

Data collected in an energy audit may be used to rank energy-conservation opportunities, usually with the goal of reducing energy consumption in a cost-effective manner. This bibliography with abstracts of about 100 items on hospital energy audits is divided into three parts: accounts of hospital energy audits; instructional material on hospital energy audits including manuals, workbooks, instructional articles, etc.; and miscellaneous documents. (ERA citation 05:012098)

LBL-9830 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Energy Transition in California.
M. N. Christensen. Jan 78, 26p CONF-780173-1
Contract W-7405-ENG-48
American Association for the Advancement of Science symposium, Houston, TX, USA, 8 Jan 1978.

This paper focuses on the elements of consensus in the energy debate and on patterns of decision by end users of energy. It argues that the common emphasis on disputed projections of depletion of oil and gas and disputes over siting of energy facilities obscures fundamental choices and developments that are already under way. Consensus on prospects of rising costs, environmental problems,

and vulnerability to uncertainties is shaping the energy transition in ways that will constrain expansion of large-scale centralized supply and shift the focus of attention to improvements in efficiency of use of energy and to development of self-help sources. It is concluded that aggregate energy demands may well peak in the early 1990s and that demands for marketed energy may well decline slowly thereafter. (ERA citation 05:015908)

N80-21829/0 PC$15.00
National Aeronautics and Space Administration, Washington, DC.
Energy. A Continuing Bibliography with Indexes, Issue 24.
Bibliography Report, 1 Oct. - 31 Dec. 1979.
Jan 80, 1075p NASA-SP-7043(24)

This bibliography lists 1609 reports, articles, and other documents introduced into the NASA scientific and technical information system from October 1, 1979 through December 31, 1979.

ORAU/IEA-79-20(M) PC **A04**/MF **A01**
Oak Ridge Associated Universities, Inc., Washington, DC. Inst. for Energy Analysis.
Italy: Estimates of Future Energy/GDP Relationships.
C. Davison, and E. L. Allen. Dec 79, 61p
Contract EY-76-C-05-0033

The Italian economy has experienced very rapid growth since World War II, accompanied by a sharp increase in the consumption of energy, the growth of which has been more rapid than the development of the economy. For the period 1960-76, energy consumption grew an average of 6.7% annually, compared with an annual growth rate of 4.6% for gross domestic product. The ratio of energy use per unit of GNP increased in every year from the early 1960s until the oil price rise in 1973 and after a brief pause then began to rise again. By 1975, when the E/GDP ratios of other industrialized OECD countries were hitting record lows, Italy's ratio was at an all-time high. This increasing E/GDP ratio has been largely the result of Italy's very rapid industrial expansion and its attempt to catch up with the stage of industrial maturity already achieved in other developed countries. It is anticipated that the E/GDP ratio will decline in the future as Italy's industrial expansion slows down. Increased efficiencies will flow from the application of new technologies and replacement of old plants. Pressure from higher oil prices and structural changes in Italian society also will dampen down the E/GDP ratio, as it has in other industrialized countries. GDP growth will slacken as the fertility rate continues its downward trend and the average workweek falls. We estimate that by the year 2000 gross energy consumption in Italy will total 6.7 quads, orabout 25% above the 1976 level, and that the E/GDP index (1976 = 100) will decline to about 79, with the residential and industrial sectors accounting for almost all of the decline. (ERA citation 05:013682)

ORAU/IEA-79-21(M) PC **A05**/MF **A01**
Oak Ridge Associated Universities, Inc., Washington, DC. Inst. for Energy Analysis.
Japan: Estimates of Future Energy/GNP Relationships in Energy Use.
J. A. Edmonds, and E. L. Allen. Dec 79, 95p
Contract EY-76-C-05-0033

In many ways Japan's recent economic experience is unparalleled in the OECD. Its GNP soared during the 1960s and early 1970s. In the 11 years following 1960, GNP tripled, and by 1976 had almost quadrupled. Japan's economic achievements are all the more impressive in light of the fact that, unlike Western European and North American OECD partners, Japan neither experienced an extended postwar baby boom nor allowed large numbers of foreign workers to enter the labor force. Rapid economic growth was accompanied by a parallel expansion of energy demand. Between 1960 and 1970, energy consumption more than doubled, and by 1976 had almost doubled again. Nothing in the analysis indicates that Japan's role as growth leader will be altered, even though economic expansion will be at a slower tempo. An early end is projected to the dramatic downward trend in fertility, with total fertility settling near 1.8. Productivity and GNP growth rates are also expected to lead the OECD, though a perceptible decline is anticipated. As a consequence of continued rapid economic expansion, Japan's energy consumption is projected to more than double between 1976 and 2000, a growth from 12.85 x 10 exp 15 Btu(quads) to 28.17 quads. At the same time GNP is projected to triple, accompanied by lowering of the Japanese energy/GNP ratio by 30%. Industrial and transportation sector energy efficiency gains are expected to lead the way, with residential and commercial sector-consumption growing almost abreast with GNP. The delayed home appliance revolution is expected to offset much of the gains from slow population growth. On the other hand, the Japanese automobile population explosion is expected to proliferate new, more energy-efficient automobiles throughout the economy, rapidly raising overall fleet performance. A significant shift toward water transport of freight also improves the overall performance of the transport sector. (ERA citation 05:013683)

ORAU/IEA-79-23(M) PC **A04**/MF **A01**
Oak Ridge Associated Universities, Inc., Washington, DC. Inst. for Energy Analysis.
France: Estimates of Future Energy/GDP Relationships.
E. L. Allen. Dec 79, 67p
Contract EY-76-C-05-0033

Compared with other OECD nations, France's postwar economic growth has been above average. Gross domestic product (GDP) grew at an annual rate of 4.1% in the 1970s. A high rate of new investment (fixed, nonresidential investment) was achieved during these years to bolster productivity gains. Since France depends primarily on imports for its energy supplies, energy use has become relatively efficient. Government policy emphasizes energy savings in all sectors; the E/GDP ratio increased only slightly to 1973 and thereafter fell sharply. As to the future, economic growth, as measured by GDP, is expected to moderate over the balance of this century, to a level of 2.8% annually by the 1995-2000 period. Labor force growth will decline because of decreased domestic fertility and the more restrictive immigration policy. In addition, the length of the workweek, which has remained relatively high, is expected to follow the declining trend already evident in other OECD countries. Future energy consumption is projected to rise from 6.61 Btu x 10 exp 15 in 1976 to 9.85 Btu x 10 exp 15 in 2000. (ERA citation 05:013662)

ORNL/CON-3[illegible] PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Performance Evaluation of a Selected Three-Ton Air-to-Air Heat Pump in the Heating Mode.
A. A. Domingorena, and S. J. Ball. Jan 80, 106p
Contract W-7405-ENG-26

An air-to-air split system residential heat pump of nominal three-ton capacity was instrumented and tested in the heating mode under laboratory conditions. This was the second of a planned series of experiments to obtain a data base of system and component performance for heat pumps. The system was evaluated under both steady-state and frosting-defrosting conditions; sensitivity of the system performance to variations in the refrigerant charge was measured. From the steady-state tests, the heating capacity and coefficient of performance were computed, and evaluations were made of the performance parameters of the fan and fan motor units, the heat exchangers and refrigerant metering device, and the compressor. System heat losses were analyzed. The frosting-defrosting tests allowed the observation of system and component performance under dynamic conditions, and measurement of performance degradation under frosting conditions. (ERA citation 05:016006)

ORNL/TM-7059 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Emergency Petroleum Conservation: A Review and Analysis of Selected Measures.
F. D. Boercker, M. Balasubramaniam, E. Hull, J. Savadelis, and J. J. Valentini. Jan 80, 151p
Contract W-7405-ENG-26

ORNL was asked by the Economic Regulatory Administration to (1) collect, screen, and recommend a limited number of emergency measures that might conserve petroleum in residential and commercial buildings and in commercial transportation and (2) provide a detailed analysis of the energy savings and the economic and environmental impacts associated with restricting the hours of operation of commercial buildings. A total of 41 emergency measures were identified that might conserve petroleum, and these were reduced to a list of five that seemed most promising. Analysis of the measure to restrict hours of operation for commercial buildings shows that it might save 4 to 6% of annual commercial building energy use. The type of fuel conserved would vary widely from region to region, and appreciable negative economic impacts would result from implementing the measure. (ERA citation 05:013737)

ORNL/TM-7154 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Comparison of Operational Energy Intensities and Consumption of Pipelines Versus Coastal Tankers: US Gulf Coast to Northeast Coast Routes.
J. Hooker, A. B. Rose, and K. M. Bertram. Jan 80, 53p ANL/CNS-TM-6
Contracts W-7405-ENG-26, W-31-109-ENG-

This report is a comparative analysis of operational energy intensities and consumption for pipeline shipments versus coastal tanker and tanker-barge movements of light petroleum products from the US Gulf Coast to US East Coast Mid-Atlantic states. It has been prepared for the Office of Transportation Programs of the US Department of Energy (DOE) as part of a project designed to develop energy conservation strategies in the areas of modal shifts and energy materials transport. It also answers an expressed interest of DOE's Office of Competition as to whether energy penalties are being paid in this region by the shipment of this oil by tanker rather than pipeline. Detailed estimates are made of the 1977 energy intensities (EIs) for tankers and the two major pipelines serving these routes; these are the Colonial pipeline (from Houston) and the Plantation pipeline (from Baton Rouge). Estimates of potential operational energy savings gained from diverting these shipments from tankers to pipelines are figured from these EIs plus 1977 tanker short-ton volumes for these products. Also estimated for these diversions are additional savings of petroleum available through shifts from the fuel oil used to power tankers, to the other energy sources used by pipelines (e.g., coal, which is burned by the utilities serving them). Table 1 indicates that these tanker volumes have been large and steady as a whole; however, individual origin ports have had substantial variations since the 1973 Arab oil embargo. Indirect energy requirements of the two modes are not included in this analysis because the methodology for calculating them is still an unresolved research area (e.g., diagreements exist as to how much supporting-infrastructure energy usage should be included for a mode). (ERA citation 05:014816)

ORNL-5612 PC **A15**/MF **A01**
Oak Ridge National Lab., TN.
Fossil Energy Program. Quarterly Progress Report for the Period Ending September 30, 1979.
L. E. McNeese. Jan 80, 347p
Contract W-7405-ENG-26

This quarterly report covers the progress made during the period June 30 through September 30 for the Oak Ridge National Laboratory research and development projects that are carried out in support of the increased utilization of coal and other fossil fuel alternatives to oil and gas as sources of clean energy. These projects are supported by the DOE Divisions of Fossil Fuel Processing, Fossil Fuel Utilization, Fossil Fuel Extraction, Planning and Systems Engineering, Basic Energy Sciences, Office of Health and Environmental Research, Office of Environmental Compliance and Overview, and by the Tennessee Valley Authority and the EPA Office of Research and Development through interagency agreements with the DOE. (ERA citation 05:011033)

ORO-5362-T2 PC **A07**/MF **A01**
Alabama Univ. in Huntsville. Kenneth E. Johnson Environmental and Energy Center.

Department of Energy, Division of Distributed Solar Technology Insolation Assessment: Contractors' Program Review. Pre-Print Summaries of Papers Presented, October 31-November 1, 1979, Bethesda, Maryland.
1979, 139p
Contract EG-77-S-05-5362

Seventeen papers are included. Separate abstracts were prepared for each one. (ERA citation 05:015095)

PAT-APPL-6-129 780 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Amplified Wind Turbine Apparatus.
Patent Application,
W. N. Myers, and L. A. Hein. Filed 12 Mar 80, 16p N80-21831/6, NASA-CASE-MFS-23830-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An amplified wind turbine apparatus is disclosed wherein ambient inlet air is prerotated in an air rotation chamber having a high pressure profile. A second rotation chamber adjacent and downstream of the turbine has a low pressure core profile whereby flow across the turbine is accelerated and thereafter exits the turbine apparatus through a draft anti-interference device. The draft device eliminates interference with ambient winds at the outlet of the turbine apparatus. Pivotable vanes controlled in response to prevailing wind direction admit air to the chambers and aid in imparting rotation.

PB80-115249 PC **E12**/MF **E12**
New Mexico Univ., Albuquerque. Technology Application Center.
Solar Thermal Components: A Bibliography with Abstracts. Quarterly Update January-March 1979,
William R. Bozman. Jun 79, 86p TAC-STC-79-001
Contract NASw-2936
See also Quarterly Update Apr-Jun 79, PB80-174006.

This bibliographic series cites and abstracts literature and technical papers on components applied to solar thermal energy utilization. The quarterly volumes are divided into ten categories: Material Properties, Flat Plat Collectors, Concentrating Collectors, Thermal Storage, Heat Pumps, Coolers and Heat Exchangers, Solar Ponds and Distillation, Greenhouses, Process Heat, and Irrigation Pumps. Each quarterly volume is compiled from a wide variety of data bases, report literature, technical briefs, journal articles and other traditional and non-traditional sources. The Technology Application Center maintains a library containing many of the articles and publications referenced in the series.

PB80-168420 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Energy Policy in a Small Open Economy: The Case of Sweden.
Final rept.,
Lars Bergman. cNov 78, 62p RR-78-16

In this paper a multisectoral model of economic growth is developed and used for analysis of the economic impact of an energy strategy proposed by the Swedish government. According to the proposal, Sweden should aim at reducing energy consumption growth from a postwar average of 5% per annum to 2% per annum between 1973 and 1985 and to zero growth thereafter. The model allows substitution between energy and other factors of production, and it has explicit export and import functions.

PB80-168719 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
MEDEE (Modele d'Evolution de la Demande d'Energie) 2: A Model for Long-Term Energy Demand Evaluation.
Final rept.,
Bruno Lapillonne. c1979, 53p RR-78-17

This report describes a simulation model, MEDEE 2, designed to evaluate the long-term energy demand of a country, in combination with a scenario description of the main aspects of the country's social, economic, and technological evolution. This approach considers in a detailed way a national energy demand pattern and breaks down the total demand in a multitude of end-use categories (e.g., residential space heating, service sector cooling, gasoline for intercity cars). The influence on energy demand of changes in social needs, economic growth, government policies, or technologies, especially in the present context of high energy prices is taken into account. In addition, the model makes possible the identification of the potential market (i.e. maximum demand that can be technically met) of each final energy form (e.g. electricity, coal, gas, solar, oil products, and district heat).

PB80-168735 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Solar Options in Central Europe. A Synthesis of Solar Technology Assessment and Contemporary Criteria in 1978-1979,
Charles R. Bell. c1979, 30p RR-79-14

This report identifies the options that are now most viable for solar energy exploitation in central Europe, and the economic as well as technical parameters of these options.

PB80-168990 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Simulation of Macroeconomic Scenarios to Assess the Energy Demand for India (SIMA).
Final rept.,
Jyoti K. Parikh, and Kirit S. Parikh. cDec 79, 59p RR-79-15

The purpose of this report is to project alternative future energy demand scenarios consistent with economic developments and possible energy supply scenarios. It is also to examine the interaction between the increased costs of energy and economic development, which may be important for developing countries where capital accumulation and imports generally constitute the major constraints on development. (Copyright (c) 1979 International Institute for Applied Systems Analysis.)

PB80-169030 PC **E07**/MF **E07**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Assessment of Alternative Energy/Environment Futures for Austria: 1977-2015.
Final rept.,
W. K. Foell, R. L. Dennis, M. E. Hanson, L. A. Hervey, and A. Hoelzl. cOct 79, 184p RR-79-7

This report presents the major results of the 15-month, Austrian case study, which examines alternative energy futures and strategies for Austria and some of their environmental implications. A secondary objective is the development of appropriate concepts and methods for energy/environment management and policy design in Austria.

PB80-169642 PC **E04**/MF **E04**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
The Dynamics of Energy Systems and the Logistic Substitution Model.
Final rept.,
C. Marchetti, and N. Nakicenovic. c1980, 86p RR-79-13

This work is dedicated to the empirical testing and theoretical formulation of an invariant, the logistic learning curve, as it applies to the structural evolution of energy systems and systems related to energy, such as coal mining. The great success of the model in organizing past data and the insensitivity to major political and economic perturbations of the structures obtained seem to lend great predictive power to this invariant. A total of about 300 cases was examined, the USA being particularly well represented. Since supertankers have made the energy system a world system, the case of the world as a whole was given special attention for its political and resource implications.

PB80-170293 PC **A08**/MF **A01**
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Problemas Energeticos en Paises Subdesarrollados (Energy Problems in Developing Countries).
Feb 79, 175p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

The need for creating energy technicians at post graduate levels in Mexico and other countries is explored. A history and description of OPEC agreements and reflections on the world economy are presented. Tables, graphics, illustrations, and a bibliography are included.

PB80-174006 PC **E12**/MF **E12**
New Mexico Univ., Albuquerque. Technology Application Center.
Solar Thermal Components: A Bibliography with Abstracts. Quarterly Update April-June 1979,
William R. Bozman. Aug 79, 121p TAC-STC-79-002
Contract NASw-2936
See also Quarterly Update Jan-Mar 79, PB80-115249.

This bibliographic series cites and abstracts literature and technical papers on components applied to solar thermal energy utilization. The quarterly volumes are divided into ten categories: Material properties, Flat Plate Collectors, Concentrating Collectors, Thermal Storage, Heat Pumps, Coolers and Heat Exchangers, Solar Ponds and Distillation, Greenhouses, Process Heat, and Irrigation Pumps. Each quarterly volume is compiled from a wide variety of data bases, report literature, technical briefs, journal articles and other traditional and non-traditional sources. The Technology Application Center maintains a library containing many of the articles and publications referenced in the series.

PB80-174352 PC **A03**/MF **A01**
Chicago Univ., IL. Resource Analysis Group.
Crude Oil Energy Requirements: From Exploration to Refinery.
Technical rept.,
Michael T. Woo. Mar 78, 50p E-43
Grant NSF-OEP75-06873

The process-type net energy analyses described in this study examines five methods of crude oil production: primary production and water injection production in West Texas; offshore production in the Gulf of Mexico and North Sea; and onshore production in the Middle East. The use of engineering and disaggregated data allows requirements to be traced at an individual input level. Overall results are divided into production: exploration to field termination, and transportation: field termination to refinery. These microstudies are technology - and situation- specific rather than industry-specific and therefore should be thought of as typical examples of industry practice rather than averaged results of industry practice. The findings indicate that the total energy used for petroleum extraction is high enough that improvements in its efficiency of use could help to generate a significant reduction in U.S. petroleum demand.

PB80-174774 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. International Div.
Prospects For A Stronger United States-Mexico Energy Relationship.
Report to the Congress.
1 May 80, 74p ID-80-11

This report focuses on the issues which have an impact on Mexico's petroleum production and export decisions and the effects of its policies on the United States and on its own economic development. It also addresses Mexico's position as a potential source of needed oil and gas to the United States and to the world at large; and it discusses the need for a proper United States relationship with Mexico on energy and other matters.

PB80-175839 PC **A02**/MF **A01**
West Virginia Univ., Morgantown. Dept. of Chemical Engineering.
Potential of Coal-Based Fuel and Energy Complexes: A Regional Appraisal.
Summary status rept. 1 Jun-30 Sep 73,

C. Y. Wen. 1973, 5p NSF-RA-N-73-382
Grant NSF-GI-38331

Reported is a project designed to develop suitable methodology for assessing the potential of various conversion technologies capable of utilizing coal in the Appalachian region to provide clean fuels and energy. Research involves development and use of engineering models for mining, conversion, and transmission in a systems evaluation. The integrated systems analysis, under constraints of resource availability and environmental quality, will permit economic criteria to form the basis for selecting technologies with the highest potential for the region. A review of literature sources provided information to establish the scope and extent of previous work. Six plant sites for study were selected on the basis of coal availability, water supplies, and topographically allowable space. Environmental and legal restrictions were also considered. Coal mining and processing are being studied, including conversion processes for coal utilization and the transmission of fuels and energy. In addition, process system analysis capabilities are being developed.

PNL-SA-7073 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Net Economic Impacts of Conservation Programs in the Building Sector.
T. J. Foley, and D. E. Deonigi. Aug 78, 13p CONF-780755-3
Contract EY-76-C-06-1830
Engineering foundation conference, Henniker, NH, USA, 27 Jul 1978.

Research measuring net impacts of specific conservation programs on affected groups is investigated. Impacts on energy use, employment, investment and trade, with special emphasis on energy use and employment are measured. Programs analyzed include the proposed National Energy Plan, recent Federal legislation, and other private research programs aimed at accelerating the market penetration of energy efficient appliances (Appendix). The results displayed are the product of the integrated analytical capabilities of ORNL, BNL, and Battelle, PNL. (ERA citation 05:012079)

PNL-SA-7317 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Potential Contribution of Solar Energy in the Northwest.
K. Drumheller. 8 Nov 78, 12p CONF-7811153-1
Contract EY-76-C-06-1830
Thermal power conference, Pullman, WA, USA, 8 Nov 1978.

Estimates on the ability of solar energy to supply US energy needs vary from 0 to 25%. It is generally thought that solar can supply as much as we want it to up to 25% in the Northwest by the year 2000 providing an all-out effort is applied now to develop solar energy. The factors affecting the extent of solar utilization are discussed; they are more institutional (inertia, experience, legal, social) than technological or economical. Because of its climate, unique power system, and amount of sunshine, the Northwest is one of the best places in the US for solar energy utilization. Solar energy used in the Northwest is more likely to meet needs that would otherwise be met by new thermal electric plants than is the case in most places. (ERA citation 05:011431)

PNL-3067 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Evaluation of Resource Impact Factors Versus Social Cost Estimates in Determining Building Energy Performance Standard Levels.
L. A. Nieves, R. J. Nesse, R. C. Adams, and C. L. McDonald. Dec 79, 123p
Contract EY-76-C-06-1830

In order to increase the welfare of society through the implementation of a building energy-performance standard, a method is required by which the least-cost means of obtaining the desired space conditioning of a building can be estimated. In other words, a life-cycle cost model must be developed to simulate the energy-related building-design decisions that would take place if resources were being allocated efficiently. The cost-minimizing model must incorporate technically efficient conservation strategies and fuel-conversion equipment, and the prices used must reflect the social value of the fuels and capital equipment used. This report explores the feasibility of developing a factor that could be used to adjust a design energy budget to account for the external costs associated with that energy consumption. One such factor, RIF (resource impact factor) has been proposed by ASHRAE. Though ASHRAE suggested the RIF x RUF (resource utilization factor) multiplier concept, RIF's were not explicitly defined. Weber (1978) suggested that RIF be defined as a ratio of social costs to effective market price. The basis for a RIF used in conjunction with a RUF is evaluated here and is found lacking. To fill the gap, a social-cost approach is developed that addresses the goals of both RIF's and RUF's. The rationale for using such an approach stems from the existence of differences between retail prices and the actual social costs of fuels. (ERA citation 05:013742)

PNL-3091 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Estimation of the Social Costs of Natural Gas.
L. A. Nieves, and J. R. Lemon. Dec 79, 64p
Contract EY-76-C-06-1830

This study determines the extent to which it is possible to develop monetary estimates of the marginal social cost of fuels, using natural gas to test a methodology that could be applied to other fuels. This requires review of previous estimates of both market and nonmarket costs to the extent that such are available. For some components of social cost, calculation of estimates from secondary data is required. The feasibility of using these estimates to develop marginal social-cost estimates for the country and for states or regions must then be evaluated. In order to develop estimates of marginal social cost for use in determining minimum life-cycle costs of building space conditioning, economic theory is used to develop a conceptual model of the market cost of fuel extraction and conversion. Then, estimation methodologies for each component of nonmarket costs are examined to assess the applicability and validity of each methodology. On the basis of this analysis, empirical estimates of both market and nonmarket components of social cost are aggregated to calculate a social-cost estimate for natural gas. 38 references. (ERA citation 05:013665)

SAND-79-8266 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Comparison Between Results of TH HELIOS and MIRVAL Computer Codes Applied to Central Receiver Solar-Energy Collection.
C. N. Vittitoe, F. Biggs, and P. L. Leary. Jan 80, 27p
Contract EY-76-C-04-0789

The Sandia computer codes HELIOS and MIRVAL were developed to predict the optical performance of reflecting solar concentrators and to model power collection by central-receiver solar-energy power plants. HELIOS is an analytic code, whereas MIRVAL uses Monte Carlo ray-tracing techniques. They have been used both internally and externally in many studies including evaluation of heliostat-receiver design, parameter studies and safety analyses. The objective of this study was to verify that HELIOS and MIRVAL give the same performance predictions. The sample problem for comparison consists of a rectangular target and alt-azimuth heliostats deployed in a north field. The results indicate that HELIOS and MIRVAL closely agree on predictions of field performance and of power density on the target plane. (ERA citation 05:015296)

SAND-79-8276 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
Silver Deterioration in Second Surface Solar Mirrors.
V. P. Burolla, and S. L. Roche. Jan 80, 40p
Contract EY-76-C-04-0789

The suitability of various heliostat mirror module designs for large solar central power systems, depends in part on the ability of the reflective surface to survive over the expected lifetime, with little loss in reflectivity. Recent observations on several module designs revealed significant deterioration of the silvered surface in an unexpectedly short time span. Current information on the extent and nature of the deterioration noticed on several mirror module designs, on the accelerated tests designed to simulate field deterioration, on the potential design solutions available, on the parameters necessary for conducting useful accelerated weathering tests, and on the nature of commercially prepared mirrors is presented. (ERA citation 05:015441)

SAND-79-8754 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Solarization of Heliostat Glasses.
J. Vitko, Jr., and J. B. Shelby. Dec 79, 28p
Contract EY-76-C-04-0789

We have observed a solar-induced decrease in Fe exp 2+ absorption in heliostat glasses from the solar furnace at Odeillo, France. This decrease occurs throughout the sampled (not just at the exposed surface) and is of sufficient magnitude to result in an increase of 2.5% in solar transmittance in a period of nine years. Optical and ESR studies did not detect a corresponding increase in Fe exp 3+ concentration. The implication of these results on a microscopic model for the observed solarization is discussed. Solar simulation studies produced effects of magnitude and sign similar to those observed in the field exposed samples, and appear to offer an attractive means for screening samples for solarization tendencies. (ERA citation 05:015442)

SERI/TP-333-538 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Feasibility Evaluation for Solar Industrial Process Heat Applications.
S. A. Stadjuhar. Jan 80, 7p CONF-800101-3
Contract EG-77-C-01-4042
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

An analytical method for assessing the feasibility of Solar Industrial Process Heat applications has been developed and implemented in a flexible, fast-calculating computer code - PROSYS/ECONMAT. The performance model PROSYS predicts long-term annual energy output for several collector types, including flat-plate, nontracking concentrator, one-axis tracking concentrator, and two-axis tracking concentrator. Solar equipment cost estimates, annual energy capacity cost, and optional net present worth analysis are provided by ECONMAT. User input consists of detailed industrial process information and optional economic parameters. Internal program data includes meteorological information for 248 US sites, characteristics of more than 20 commercially available collectors representing several generic collector types, and defaults for economic parameters. Because a fullscale conventional back-up fuel system is assumed, storage is not essential and is not included in the model. (ERA citation 05:011678)

SERI/TP-351-529 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Goals: Objects and Measures of Progress.
K. C. Brown. Jan 80, 8p CONF-791024-13
Contract EG-77-C-01-4042
Solar industrial process heat conference, San Francisco, CA, USA, 31 Oct 1979.

One of the most useful outputs of systems and market analysis is a concise statement of technology goals. The concept of goal-setting as previously developed in other programs of research and development is introduced. In this context goals are merely the visible output of a systematic translation of market requirements into research and development actions. Cost goals are one type of information linkage between market and research, although a complete statement of technology goals must include both tangible and intangible physical requirements as well. The process of devising goals and measuring progress against these goals is briefly illustrated in an example from the Solar Industrial Process Heat Program. The process of establishing a program framework and program goals has not been completed for solar process heat; it is hoped that this paper will encourage steps in this direction. (ERA citation 05:013237)

SERI/TP-351-559 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.

SOLPOND: A Simulation Program for Salinity Gradient Solar Ponds.
J. Henderson, and C. M. Leboeuf. Jan 80, 7p
CONF-800101-4
Contract EG-77-C-01-4042
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

A computer simulation design tool was developed to simulate dynamic thermal performance for salinity gradient solar ponds. Dynamic programming techniques allow the user significant flexibility in analyzing pond performance under realistic load and weather conditions. Finite element techniques describe conduction heat transfer through the pond, earth, and edges. Results illustrate typical thermal performance of salinity gradient ponds. Sensitivity studies of salty pond thermal performance with respect to geometry, load, and optical transmission are included. Experimental validation of the program with an operating pond is also presented. (ERA citation 05:011694)

UCRL-83813 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Prospects for Using Improved Climate Information to Better Manage Energy Systems.
W. J. Quirk, and J. E. Moriarty. Jan 80, 12p
CONF-800309-2
Contract W-7405-ENG-48
International workshop on the energy/climate interactions, Munster, F.R. Germany, 3 Mar 1980.

The impacts that climate anomolies have had on energy systems in the United States, and the resulting impacts on society are described. It is pointed out that better use of climate information could alleviate some of the adverse consequences of these anomalies. Finally, the possibility of international cooperation in using climate information to avoid potentially worsening conditions during a gloval energy shortage is examined. (ERA citation 05:013743)

UHMET-79-15 PC **A04**/MF **A01**
Hawaii Univ., Honolulu. Dept. of Meteorology.
Hawaii Wind Power Survey: Fixed Station Data.
C. S. Ramage, N. E. Oshiro, and S. T. Yokogawa. Dec 79, 66p
Contract EG-77-G-03-1617

Winds are measured at windy locations in the Hawaiian Islands for periods ranging from 9 to 40 months. Careful calibration and comparison with the nearest airport measurements allow for correction or elimination of bad data. The differences were sufficiently small to justify computing speed duration and power density, and diurnal variations of wind speed and power density for each station. A significant area on each island possesses high annual wind power (power density at 50 m (164) AGL exceeding 400 W m exp -2). The monitoring of the strong wind area of northwest Molokai, until now sampled only during a mobile survey, is outlined. Plans include making detailed measurements of the turbulence characteristics and the vertical profile of the wind in each of the major strong wind areas. (ERA citation 05:011814)

USGS-OFR-79-2-ER PC **A06**/MF **A01**
Missouri Dept. of Natural Resources, Rolla. Div. of Geology and Land Survey.
Evaluation of the Mineable Coal Reserves of the Northern Bevier, Mendota, and Novinger Coal Fields in North-Central Missouri.
C. E. Robertson, and D. C. Smith. 1979, 104p
Contract ET-76-G-01-9080

Remaining demonstrated resources and reserves were computed for the northern half of the Bevier, and the Mendota and Novinger Coal Fields by thickness, depth of overburden, and degree of reliability. A total coal resource base of 1020.2 million short tons was computed as of November 30, 1977 in portions of Randolph, Chariton, Macon, Adair, and Putnam Counties. As of November 30, 1977, the northern Bevier Field contained a remaining demonstrated coal resource base of 314.9 million short tons, the Mendota Field 246.2 million short tons, and the Novinger Field 459.1 million short tons. Demonstrated recoverable reserves were computed at 612.4 million short tons for portions of the five county area. The northern Bevier Field contains a remaining demonstrated recoverable reserve of 217.3 million short tons, the Mendota Field 154.6 million short tons, and the Novinger Field 240.5 million short tons. Demonstrated recoverable reserves of strip coal were calculated as follows: northern Bevier Field, 192.4 million short tons; Mendota Field, 114.4 million short tons; and Novinger Field, 66.4 million short tons. The combined total for all 3 fields is 373.2 million short tons. Obstructions to mining are present within the three coal fields and are described: areas of nondeposition, faults, channelization or erosion, etc. (ERA citation 05:011137)

10B. Power Sources

AD-A083 092/7 PC **A06**/MF **A01**
Research Triangle Inst Research Triangle Park NC
Development of High Efficiency Stacked Multiple Bandgap solar Cells.
Final rept. 1 Aug 78-30 Sep 79,
S. M. Bedair, J. R. Hauser, M. F. Iamorte, S. Phatak, and M. L. Timmons. Oct 79, 102p RTI-41U-1678, AFAPL-TR-79-2116
Contract F33615-78-C-2077

The objective of this research was to develop the technology required to fabricate two-junction, cascade solar cell assemblies having conversion efficiencies exceeding 25 percent when operating at 25 deg C under 1 sun, AM O conditions. The experimental effort has focused on several different III-V ternary and quaternary materials that show promise for use in fabricating a cascade cell. These include GaA1As, GaInAs, GaInP, GaAsSb, and GaA1AsSb. The work also includes theoretical calculations of cascade solar cell performance over a wide range of operating temperatures. (Author)

AD-A083 481/2 PC **A99**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Electrical Equipment of Electrical Stations and Substations.
L. N. Baptidanov, and V. I. Tarasov. 25 Oct 79, 1548p Rept no. FTD-ID(RS)T-1348-79
Unedited machine trans. of mono. Elektrooborudovaniye Elektricheskikh Stantsiy i Podstantsiy, Moscow-Leningrad, 1960 p6-408.

No abstract available.

AD-A083 606/0 PC **A04**/MF **A01**
American Univ Washington DC
Definition of Chemical and Electrochemical Properties of a Fuel Cell Electrolyte.
Interim technical rept. 24 Jul 78-24 Dec 79,
Jalil Ahmad, and R. T. Foley. Jan 80, 70p
Contract DAAK70-77-C-0080

The present research is oriented toward the task of developing an improved electrolyte for the direct hydrocarbon-air fuel cell. The electrochemical behavior of methanesulfonic acid, ethanesulfonic acid, and sulfoacetic acid as fuel cell electrolytes was studied in a half cell at various temperatures. The rate of electro-oxidation of hydrogen at 115 degrees was very high in methanesulfonic acid and sulfoacetic acids. The rate of the electro-oxidation of propane in methanesulfonic acid at 80 degrees C and 115 degrees C was low. Further, there is evidence for adsorption of these acids on the platinum electrode. Sulfoacetic acid with H2 has supported about two times higher current density than trifluoromethanesulfonic acid monohydrate, but, attempts to purify the compound were unsuccessful. It was concluded that anhydrous sulfonic acids are not good electrolytes; water solutions are required. Sulfonic acids containing unprotected C-H bonds are adsorbed on platinum and probably decompose during electrolysis. A completely substituted sulfonic acid would be the preferred electrolyte. (Author)

CONF-790815-35 PC **A02**/MF **A01**
Argonne National Lab., IL.
Cryogenic Aspects of the UTSI CFFF Superconducting Dipole Magnet for MHD Research.
R. C. Niemann, S. T. Wang, and J. W. Dawson. 1979, 12p
Contract W-31-109-ENG-38
Cryogenic engineering conference, Madison, WI, USA, 21 Aug 1979.

The cryogenic aspects of the design of a large superconducting dipole magnet system to be employed for research in magnetohydrodynamics at the University of Tennessee Coal Fired Fuel Facility are presented. The system incorporates a low loss liquid helium cryostat, an integrated helium refrigerator/liquefier, and the necessary controls and instrumentation for cooldown, steady state operation, and fault conditions. Details of the design include the magnet cryostat, the cryogenic support system, instrumentation, and operations for cooldown, steady state, and fault conditions. (ERA citation 05:015948)

COO-2681-3 PC **A06**/MF **A01**
Hydronautics, Inc., Laurel, MD.
Theoretical Evalutation of the Seakeeping Behavior of Large OTEC Plant Platforms and Cold Water Pipe Configurations.
R. A. Barr, P. Murphy, and V. Ankudinov. Aug 78, 102p
Contract EY-76-C-02-2681

A theoretical study of the seakeeping behavior of a number of large ocean thermal energy conversion (OTEC) platform/cold water pipe configurations is described. Both the theoretical methods employed and parametric calculated results are described. In the present study five generic platform types (ship, submarine, semi-submersible, disc and spar) and three CWP materials (aluminum, reinforced concrete and glass reinforced plastic or GRP) were considered. (ERA citation 05:013338)

COO-4150-77/8 PC **A04**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Design of a Self-Regulating Composite Bearingless Blade Wind Turbine. Final Report, October 15, 1976-August 15, 1977.
P. A. M. Spierings, and M. C. Cheney. Jan 78, 69p
Contract EG-77-C-02-4150

A study was undertaken to design a 40-ft diameter wind turbine employing the UTRC/ERDA Self-Regulating Composite Bearingless Rotor (CBR) concept. The CBR concept was developed at United Technologies for rotary wing applications and is now in use on Sikorsky helicopters. The concept was further developed for wind turbine applications at UTRC under an ERDA contract in 1975-76. Successful wind tunnel tests were conducted during that contract, which demonstrated the self-starting and self-regulating features. The latest contract was to design a 40-ft system in the 5 kW - 15 kW power range. This effort included performance tradeoff studies, stress analyses of the blade and tower structure, a stability investigation, and engineering drawings of the complete system. However an overall cost analysis was not performed in this study. (ERA citation 05:011823)

COO-4206-10 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
Security Assessment of Power Systems Including Energy Storage and with the Integration of Wind Energy. Progress Report, July 1-September 30, 1979.
D. P. Carroll, and P. C. Krause. Oct 79, 5p
Contract AS02-77ET29100

The progress of the first three tasks of the wind energy part of the contract is discussed. Emphasis is on the modeling of the wind and the detailed computer representations of three candidate wind systems; namely, MOD-1, MOD-2 and the Shackle machine. Once the detailed computer representations of these wind systems have been developed the next step is to begin work on the reduced order models to be used in transient stability programs. (ERA citation 05:011824)

COO-4577-9 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Solar Photovoltaic/Thermal Residential Systems.
M. C. Russell. 28 Dec 79, 54p
Contract EG-77-S-02-4577

The results of a conceptual design study using computer simulations to determine the physical and economic performance of combined photovoltaic/thermal collector heat-pump solar systems for

a single-family residence are presented. Economic analyses are based upon projected costs for a 1986 system installation. The results show that PV/T collector systems can be economically competitive for a cold climate residence, that systems employing on-site electrical storage batteries are not economically competitive with utility-interactive systems, and that an ambient-air-source heat-pump system has a lower life-cycle cost than a solar-source heat-pump system. (ERA citation 05:015372)

COO-4931-02 PC **A09/MF A01**
Deep Oil Technology, Inc., Long Beach, CA.
Feasibility Design Study. Land-Based OTEC Plants. Final Report.
J. H. Brewer, J. Minor, and R. Jacobs. Jan 79, 199p
Contract ET-78-C-02-4931

The purpose of this study has been to determine the feasibility of installing 10 MWe (MegaWatt-electric) and 40 MWe land-based OTEC demonstration power plants at two specific sites: Keahole Point on the western shore of the island of Hawaii; and Punta Tuna, on the southeast coast of the main island of Puerto Rico. In addition, the study has included development of design parameters, schedules and budgets for the design, construction and operation of these plants. Seawater systems (intake and discharge pipes) were to be sized so that flow losses were equivalent to those expected with a platform-based OTEC power plant. The power module (components and general arrangement was established based on the TRW design. Results are presented in detail. (ERA citation 05:013339)

DOE/CS/8720-2 PC **A10/MF A01**
Arizona Power Authority, Phoenix.
Southwest Project: Resource/Institutional Requirements Analysis. Volume II. Technical Studies.
Dec 79, 225p
Contract EM-76-C-01-8720

The project provides information which could be used to accelerate the commercialization and market penetration of solar electric generation plants in the southwestern region of the United States. The area of concern includes Arizona, California, Colorado, Nevada, New Mexico, Utah, and sections of Oklahoma and Texas. The project evaluated the potential integration of solar electric generating facilities into the existing electric grids of the region through the year 2000. The technologies included wind energy conversion, solar thermal electric, solar photovoltaic conversion, and hybrid solar electric systems. Each of the technologies considered, except hybrid solar electric, was paired with a compatible energy storage system to improve plant performance and enhance applicability to a utility grid system. The hybrid concept utilizes a conventionally-fueled steam generator as well as a solar steam generator so it is not as dependent upon the availability of solar energy as are the other concepts. Operation of solar electric generating plants in conjunction with existing hydroelectric power facilities was also studied. The participants included 12 electric utility companies and a state power authority in the southwestern US, as well as a major consulting engineering firm. An assessment of the state-of-the-art of solar electric generating plants from an electric utility standpoint; identification of the electric utility industry's technical requirements and considerations for solar electric generating plants; estimation of the capital investment, operation, and maintenance costs for solar electric generating plants; and determination of the capital investment of conventional fossil and nuclear electric generating plants are presented. (ERA citation 05:015245)

DOE/CS/8720-4 PC **A09/MF A01**
Arizona Power Authority, Phoenix.
Southwest Project: Resource/Institutional Requirements Analysis. Volume IV. Institutional Studies.
Dec 79, 182p
Contract EM-76-C-01-8720

The purpose of this study was to investigate ways to accelerate the commercialization of solar electric-generating plants and their expected market penetration into the electric utility network of the southwestern US through year 2000. The study was conducted primarily from a utility perspective and included the utility view of the technical, legal, economic, and institutional considerations necessary to make central-station generation of electricity from solar power commercially successful. No dispersed uses of solar electric generation were addressed. The report provides a basis from which periodic updates can be made to analyze the effect of economic trends and technology developments on utilization of solar and/or conventional electric generation as technology continues to progress in future years. The basis established in this report utilized current state-of-the-art technology for solar and conventional electric generating plants. Also, 1977 costs of conventional electric generating plants were utilized. The cost of first generation commercial solar electric generating plants was based on assumptions reflecting large-scale manufacturing of components by a mature industry. (ERA citation 05:011642)

DOE/EIA-0057/1(79) PC **A03/MF A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013702)

DOE/EIA-0057/10(79) PC **A03/MF A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: Idaho, Oregon and Washington.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in Idaho, Oregon, Washington. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013711)

DOE/EIA-0057/11(79) PC **A03/MF A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: Alaska, Hawaii, Puerto Rico and Virgin Islands.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in Alaska, Hawaii, Puerto Rico, and Virgin Islands. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013712)

DOE/EIA-0057/2(79) PC **A03/MF A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: Delaware, New Jersey and New York.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in Delaware, New Jersey, and New York. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013703)

DOE/EIA-0057/3(79) PC **A03/MF A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: District of Columbia, Maryland, Pennsylvania, Virginia and West Virginia.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in Washington, D.C., Maryland, Pennsylvania, Virginia, and West Virginia. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013704)

DOE/EIA-0057/4(79) PC **A03/MF A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina and Tennessee.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013705)

DOE/EIA-0057/5(79) PC **A03/MF A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013706)

DOE/EIA-0057/6(79) PC **A03/MF A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: Arkansas, Louisiana, New Mexico, Oklahoma and Texas.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, or industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013707)

DOE/EIA-0057/7(79) PC **A03/MF A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: Iowa, Kansas, Missouri and Nebraska.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in Iowa, Kansas, Missouri, and Nebraska. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013708)

DOE/EIA-0057/8(79) PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013709)

DOE/EIA-0057/9(79) PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Principal Electric Facilities: Arizona, California and Nevada.
1979, 48p

A detailed map is presented covering information to June 30, 1978 on the principal electric facilities in California, Arizona, and Nevada. Utilities are listed by name and type of owner (private, cooperative, municipal, state or territory, Federal, industrial). Individual plants are identified on the map with information on MW capacity and type (steam, nuclear, internal combustion, hydro, combustion turbine, combined cycle) of plant and plant location given in tables. Sites of transmission lines are identified. (ERA citation 05:013710)

DOE/ER-0036/1 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Office of Energy Research.
Preliminary Environmental Assessment for the Satellite Power System (SPS). Revision 1. Volume 1. Executive Summary.
Jan 80, 64p

A preliminary assessment of the environmental impacts of the proposed satellite power system (SPS) is summarized here. In this system, satellites would collect solar energy in space, convert it to microwaves, and transmit the microwaves to receiving antennas (rectennas) on earth. At the rectennas, the microwaves would be converted to electricity. The assessment considers microwave and nonmicrowave effects on the terrestrial environment and human health, atmospheric effects, and disruption of communications and other electromagnetic systems. (ERA citation 05:014253)

DOE/ET-0118 PC **A13**/MF **A01**
Department of Energy, Washington, DC. Office of Solar, Geothermal, Electric and Storage Systems.
Ocean Energy Systems. Fiscal Year 1979, Program Summary.
1979, 284p

A review of ocean thermal energy conversion technology, test facilities, and research programs is given; and project summaries for DOE contracts are included. The project summaries list the contractor, contract title and number, funding, and work location and provide a brief description of the project. Also, project summaries for technologies for alternate ocean energy systems employing ocean currents, ocean waves, and salinity gradients are included. The technical status and program plans for each of the alternate technologies are discussed. (ERA citation 05:013340)

DOE/ET/23012-T1 PC **A02**/MF **A01**
Radiation Monitoring Devices, Inc., Watertown, MA.
High Efficiency Thin Film CdTe Solar Cells. First Quarterly Progress Report, March 19-June 18, 1979.
H. B. Serreze, G. Entine, and R. B. Goldner. Jul 79, 17p
Contract AC04-79ET23012

During the first quarter of this contract, facilities for the high vacuum evaporation of thin film CdTe were prepared. A number of evaporations were performed of both p-type (phosphorus doped) and n-type (halogen doped) CdTe on both conductive and non-conductive substrates. Optical, physical, and electrical evaluations were made. Initial results indicate that the films are predominantly cubic, but that film resistivity is generally still too high and that an anomalous barrier exists at the ITO/n-CdTe interface. (ERA citation 05:013250)

DOE/ET/23013-T2 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park. Materials Research Lab.
Controlled Cadmium Telluride Thin Films for Solar Cell Applications (Emerging Materials Systems for Solar Cell Applications). Quarterly Progress Report No. 1, April 9-July 8, 1979.
K. Vedam. Aug 79, 12p
Contract AC02-79ET23013

Preparation and properties of cadmium telluride thin films for use in solar cells are studied. CdTe sputter deposition, crystal doping, and carrier typing are discussed. Future experimental plans are described. (ERA citation 05:013251)

DOE/ET/23063-1 PC **A09**/MF **A01**
Science Applications, Inc., McLean, VA.
Solar Photovoltaic Flat Panel Applications Experiment at the Oklahoma Center for Science and Arts. Final Report, September 30, 1978-May 31, 1979.
Jun 79, 186p
Contract ET-78-C-04-5403

Science Applications, Inc., has designed a photovoltaic power system for the Oklahoma Center for Science and Arts in Oklahoma City. The system, with a basic rating of 250 kW, is enhanced to a summer peak output of 350 kW through the use of augmentation glass mirror reflectors which are arranged to maximize summer output and to match the summer output to the summer load. The baseline system consists of 3780 photovoltaic collector modules, utilizing polycrystalline silicon cells, and companion mirror reflectors arranged in modular fashion on the roof of the Center. Total system output is more than 450 MWh, of which over 420 MWh is used on-site to displace about 65 percent of the current on site load, or about 43 percent of the projected (1981) load. Another 30 MWh is returned to the utility under a buyback agreement. The total amount of energy displaced per year is approximately 850 barrels of oil, or Btu equivalent. The entire system is fully automatic, and is designed for safety and ease in maintenance and repair. It is equipped with the appropriate controls, a power monitoring system, a weather station, and other sensors for acquisition of experimental data. (ERA citation 05:015224)

DOE/ET/23103-18 PC **A02**/MF **A01**
Delaware Univ., Newark. Coll. of Engineering.
Theory of Thin-Film Photovoltaics. Technical Report No. 3. Non-Ideal Diode Factors.
K. W. Boer. 1979, 23p
Contract AC01-79ET23103

It is shown that non-ideal diodes with an A-factor in the exponent larger than two can be explained when the junction recombination starts to saturate. In photovoltaic cells in which the density of minority carriers can be varied independent of the bias voltage, this behavior becomes transparent and is used as an examples for the proposed model. (ERA citation 05:013253)

DOE/JPL/1012-38 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Low-Cost Solar Array Project. LSA Field Test Annual Report, August 1978-August 1979.
P. Jaffe. 15 Dec 79, 50p
Contract EX-76-A-29-1012

In the course of three years of testing no evidence has resulted to suggest that the twenty-year-life goal for photovoltaic modules will not be met. Results of studies of more than 600 modules under test show that they are generally enduring well both electrically and physically, particularly those from more recent procurements. Degradation tests performed at JPL indicate that electrical degradation is not a slow monotonically increasing phenomenon as originally thought but occurs abruptly as the result of some traumatic event. This finding has led to a change in the test philosophy. The report includes a discussion of this change, a summary of degradation and failure data from all the sites, results from a variety of special tests, and a description of new instrumentation for in-field measurements. The field testing activity was expanded by the addition of twelve remote sites located as far away as Alaska and the Canal Zone. A description of the new sites is also included. (ERA citation 05:013305)

DOE/JPL/954373-12 PC **A03**/MF **A01**
Crystal Systems, Inc., Salem, MA.
Silicon Ingot Casting: Heat Exchanger Method. Multi-Wire Slicing: Fixed Abrasive Slicing Technique. Phase III. Quarterly Progress Report No. 4, July 1-September 30, 1979.
F. Schmid, and C. P. Khattak. Oct 79, 34p
Contract NAS-7-100-954373

This contract is for casting silicon ingots by the Heat Exchanger Method (HEM) and slicing by multi-wire Fixed Abrasive Slicing Technique (FAST). Significant advancements have been made in the area of crystal casting. It has been demonstrated that nearly single crystal ingots can be cast with a single HEM solidification of upgraded metallurgical grade silicon. The impurities were rejected to the last material to freeze-near the wall of the crucible. The resistivity of the silicon after directional solidification by HEM was 0.1 to 0.2 omega -cm. Macroscopic impurities, presumably SiC, did not break down the solid-liquid interface and, in some cases, caused only localised twin formation. This material may be used for making solar cells directly. The HEM process has been scaled up to solidify 22 cm x 22 cm square cross-section ingots weighing up to 10.5 kg. The 22 cm square cross-section ingot is nearly all single crystal material. For silicon slicing using FAST significant progress has been made in demonstrating high throughput of the slicer and extended life of the wires. Cutting rates exceeded 1986 goals by more than 40%. This has been achieved with the combination of high speeds of the slicer and improvement in the blade. Emphasis in the area of blade development has been with impregnation using CSI technology of impregnating diamonds only in the cutting edge. (ERA citation 05:015146)

DOE/JPL/954833-2 PC **A06**/MF **A01**
Boeing Engineering and Construction, Seattle, WA.
Wind Loads on Flat Plate Photovoltaic Array Fields. Phase II. Final Report.
R. Miller, and D. Zimmerman. Sep 79, 115p
Contract NAS-7-100-954833

This report describes a theoretical study of the aerodynamic forces resulting from winds acting on flat plate photovoltaic arrays. Local pressure distributions and total aerodynamic forces on the arrays are shown. Design loads are presented to cover the conditions of array angles relative to the ground from 20 exp 0 to 60 exp 0 , variable array spacings, a ground clearance gap up to 1.2 m (4 ft) and array slant heights of 2.4 m (8 ft) and 4.8 m (16 ft). Several means of alleviating the wind loads on the arrays are detailed. The expected reduction of the steady state wind velocity with the use of fences as a load alleviation device are indicated to be in excess of a factor of three for some conditions. This yields steady state wind load reductions as much as a factor of ten compared to the load incurred if no fence is used to protect the arrays. This steady state wind load reduction is offset by the increase in turbulence due to the fence but still an overall load reduction of 2.5 can be realized. Other load alleviation devices suggested are the installation of air gaps in the arrays, blocking the flow under the arrays and rounding the edges of the array. Included is an outline of a wind tunnel test plan to supplement the theoretical study and to evaluate the load alleviation devices. (ERA citation 05:015225)

DOE/JPL/955244-2 PC **A04**/MF **A01**
Optical Coating Lab., Inc., City of Industry, CA. Photoelectronics Div.
Development of Low Cost Contacts to Silicon Solar Cells. Semi-Annual Report, 15 Octobr 1978–31 May 1979.
P. A. Iles, and D. P. Tanner. 1979, 75p
Contract NAS-7-100-955244

The 7 months of the original contract have been completed. A number of different electroless plating systems have been evaluated in conjunction with copper electroplating and a final contact system has been settled on. All tests have involved simultaneous deposition of front and back contacts using a standard silicon cell material throughout the contract. Cells with good adhesion and good curve fill factors have been obtained using a palladium-chromium-copper metallization system. Forty 2 1/4 in. diameter cells, which incorporate the palladium-chromium-copper metallization system, have been delivered to JPL. As an additional experiment to the contract, the final copper contact system was evaluated to determine if the copper would migrate at elevated temperatures. Results indicate that copper does, indeed, migrate at elevated temperatures causing cell output degradation and that further work is needed to produce a reliable copper-based metallization system for solar cells. (ERA citation 05:015154)

DOE/JPL/955324-2 PC **A02**/MF **A01**
Motorola, Inc., Phoenix, AZ. Semiconductor Group.
Development of a Method of Producing Etch Resistant Wax Patterns on Solar Cells. Quarterly Technical Report No. 2, 1 April 1979-30 June 1979.
E. Pastirik. 1979, 11p
Contract NAS-7-100-955324

Progress during the second quarter of a one-year program to investigate the production of patterned etch resistant wax coatings on solar cell substrates by printing is described. The master molds produced in the past have been used to produce an assortment of printing plates composed of different materials having properties which are considered to be advantagious for printing hot or cold waxes onto hard solar cell surfaces. The first printing device used is now being replaced by a more advanced apparatus fabricated using parts taken from water handling equipment. The new device constructed will afford greater flexibility in temperature control and printing plate manipulation. In addition to the Multiwax 195M used in the early part of this program, Apiezon W and glycol phthalate waxes are now also under study. (ERA citation 05:015158)

DOE/NASA/0062-79/1 PC **A04**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
15 KWe (Nominal) Solar Thermal Electric Power Conversion Concept Definition Study: Steam Rankine Reheat Reciprocator System.
H. Fuller, R. Demler, E. Poulin, and P. Dantowitz. Jun 79, 56p NASA-CR-159590
Contract EX-76-A-29-1060

An evaluation was made of the potential of a steam Rankine reheat reciprocator engine to operate at high efficiency in a point-focusing distributed receiver solar thermal-electric power system. The scope of the study included the engine system and electric generator. Not included in the scope was the solar collector/mirror or the steam generator/receiver. A parametric analysis of steam conditions was completed leading to the selection of 973K (1292F)/12.1 MPa (1750 psia) as the steam temperature/pressure for a conceptual design. A conceptual design was completed for a two cylinder/opposed engine operating at 1800 rpm directly coupled to a commercially available induction (motor) generator. A unique part of the expander design is the use of carbon/graphite piston rings to eliminate the need for using oil as an upper cylinder lubricant. The evaluation included a system weight estimate of 230 kg (500 lb) at the mirror focal point with the condenser mounted separately on the ground. The estimated cost of the overall system is $1932 or $90/kW for the maximum 26 kW output. (ERA citation 05:015308)

DOE/NASA/0600-79/1 PC **A07**/MF **A01**
Kaman Aerospace Corp., Bloomfield, CT.
Design, Fabrication, Test, and Evaluation of a Prototype 150-Foot Long Composite Wind Turbine Blade.
H. W. Gewehr. Sep 79, 138p NASA-CR-159775
Contract EX-76-A-29-1028

The design, fabrication, test, and evaluation of a prototype 150-foot long composite wind turbine blade are described. The objective of the program was to develop the engineering and fabrication technology for blades in this unprecedented size range having the potential for low cost fabrication in production quantities. The major part of the engineering effort on this project was devoted to structural design and material selection which are compatible with low cost fabrication methods and objectives. (ERA citation 05:013450)

DOE/NASA/1028-79/25 PC **A04**/MF **A01**
Toledo Univ., OH.
Aeroelastic Equations of Motion of a Darrieus Vertical-Axis Wind-Turbine Blade.
K. R. V. Kaza, and R. G. Kvaternik. Dec 79, 58p NASA-TM-79295
Contract EX-76-A-31-1028

The second-degree nonlinear aeroelastic equations of motion for a slender, flexible, nonuniform, Darrieus vertical-axis wind-turbine blade which is undergoing combined flatwise bending, edgewise bending, torsion and extension are developed using Hamilton's principle. The blade aerodynamic loading is obtained from strip theory based on a quasi-steady approximation of two-dimensional incompressible unsteady airfoil theory. The derivation of the equations has its basis in the geometric nonlinear theory of elasticity and the resulting equations are consistent with the small deformation approximation in which the elongations and shears (and hence strains) are negligible compared to unity. These equations are suitable for studying vibrations, both static and dynamic aeroelastic instabilities, and dynamic response. Several possible methods of solution of the equations, which have periodic coefficients, are discussed. (ERA citation 05:013452)

DOE/TIC-11070 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Div. of Solar Technology.
Satellite Power System (SPS) Program. Program Summary.
Jan 78, 34p

The objective of this joint DOE/NASA SPS concept evaluation program is to develop by the end of 1980 an initial understanding of the technical feasibility, economic practicability, and the social and environmental acceptability of the SPS concept so that recommendations concerning program continuation can be made. In executing its management responsibility. DOE, with the cooperation of NASA, has developed an SPS Concept Development and Evaluation Program Plan. This plan details the various technical and environmental subprograms or tasks needed to be completed by 1980. The four major study areas that have been identified are being undertaken during the SPS program are: (1) systems definition; (2) evaluation of environmental, health, and safety (EH and S) factors; (3) study of socioeconomic issues; and (4) comparative assessment of alternative energy systems. Descriptions of the SPS projects sponsored by DOE are presented. (ERA citation 05:013307)

DSE-2332-T1 PC **A02**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
System Dynamics of Multi-Unit Wind Energy Conversion Systems Application. Executive Summary.
15 Feb 78, 11p
Contract EX-76-C-01-2332

Fluctuation in wind speed causes a in wind power output which is unique among utility level power sources. It is important that the feasibility and the constraints of installing a significant number of wind turbine generators into the national power system be investigated. The objective of this study is to determine the effect of wind variability and wind machines on the stability of the electrical power system and to provide design information for the machine designer and the utility user. (ERA citation 05:015653)

DSE-3413-T3 PC **A04**/MF **A01**
Solarex Corp., Rockville, MD.
Photovoltaic Mechanisms In Polycrystalline Thin Film Solar Cells. Quarterly Technical Progress Report No. 4, July 1-September 30, 1979.
G. Storti, S. Johnson, H. C. Lin, and R. W. Armstrong. 1979, 51p
Contract ET-78-C-01-3413

A more detailed model of the vertical junction effect was generated which investigates both the increase in light generated current due to enhanced collection at the grain boundary and the increase in dark current due to the increased junction area. Results show that there is an overall increase in the cell's maximum power; however, the increase in power is negligible for grain widths exceeding a few tenths of a millimeter. Solar cells were fabricated on a longitudinal section of cast polysilicon which was analyzed crystallographically by means of x-ray diffraction patterns. Special crystallographic orientation relationships are identified for the relative orientations of adjacent grains and for the alignment of their boundary interfaces along certain planar segments. The dark I-V characteristics of the polysilicon cells were dominated by recombination within the space-charge region. Scanning photoresponse patterns are matched with the microstructural information to show, in the absence of any detectable impurity effects, that an insignificant or reduced photoresponse measurement is associated with certain boundaries depending on their structural character. The special orientations of grains are indicated on the basis of a model example to be derived from single or multiple twinning relationships on (111) systems. (ERA citation 05:015160)

DSE-4042-T18 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Materials Science and Engineering.
Photoelectronic Properties of Zinc Phosphide Crystals, Films and Heterojunctions. Quarterly Progress Report No. 3, October 1-December 31, 1979.
R. H. Bube. 1979, 15p
Contract EG-77-C-01-4042

An increase in crystal growth rate for Zn sub 3 P sub 2 was achieved by a vacuum baking step before crystal growth designed to reduce the pressure of excess gases in the ampoule. An analysis of the problem indicates that results are consistent with expectations. Samples have been submitted to SERI for mass spectroscopic evaluation and SIMS analysis. Construction of suitable equilibrium defect distribution diagrams for Zn sub 3 P sub 2 was initiated. Typical diagrams with their interpretation will be included in the next report. Good rectifying diodes were prepared by vacuum evaporation of Mg onto etched surfaces of Zn sub 3 P sub 2 . A barrier height of 0.75 eV was measured from C-V data in good agreement with the published value of 0.80 eV. If the Zn sub 3 P sub 2 surface was given a heat treatment in oxygen before Mg evaporation, the Mg made an ohmic contact indistinguishable from the normal ohmic Ag contact to Zn sub 3 P sub 2 . If the Zn sub 3 P sub 2 surface was given a heat treatment in hydrogen before Mg evaporation, good diode characteristics were observed, with strong forward current saturation above 1V. The resistivity of Zn sub 3 P sub 2 films deposited by CSVT in Ar is 1500 ohm-cm before laser annealing and 1200 ohm-cm after laser annealing. Laser annealing apparently produces a preferred orientation of these films. Microprobe analyses of the films deposited by CSVT and vacuum evaporation indicate that these films are almost always Zn-rich with an average 69 atomic % Zn and 31 atomic % P. Films deposited by vacuum evaporation, on the other hand, are strongly P-rich. Variations in stoichiometry with position on a single film are also observed. (ERA citation 05:015161)

DSE-4042-T23 PC **A02**/MF **A01**
Radiation Monitoring Devices, Inc., Watertown, MA.
Low Cost Sprayed CdTe Solar Cell Research. First Quarterly Progress Report, 15 August-14 November 1979.
P. Sienkiewicz, S. Lis, H. B. Serreze, and G. Entine. Dec 79, 17p
Contract EG-77-C-01-4042

During the first quarter of this contract, facilities for the spray pyrolysis deposition of CdTe thin films

using a process anolagous to that used to spray deposit device-quality films of CdS were prepared. A Te salt, beta -(CH sub 3) sub 2 Tel sub 2 , suitable for use in the spray process was synthesized. The facilities were shown to function properly by the successful spraying of good quality CdS thin films. A number of initial spray experiments were conducted utilizing the beta -(CH sub 3) sub 2 Tel sub 2 and other inorganic tellurium-bearing compounds which also show great promise in producing low-cost sprayed CdTe solar cells. Initial chemical tests of these films indicated the presence of both Cd and Te, and x-ray diffraction analysis is presently underway to determine the actual concentration of CdTe. (ERA citation 05:015162)

EPRI-EM-1192 PC **A06**/MF **A01**
Systems Control, Inc., Palo Alto, CA.
Impact on Transmission Requirements of Dispersed Storage and Generation. Final Report.
S. T. Lee, J. Peschon, and A. Germond. Dec 79, 122p

The objective of this study is to estimate the transmission and subtransmission credits of dispersed power plants such as batteries and fuel cells. Average credit and a range for the US were obtained by extrapolation based on two case studies using the EPRI Synthetic Electric Utility Systems (EPRI EM-285, 1977). A conventional approach using traditional utility planning criteria and a probabilistic approach which is developed in Europe using a combined generation-transmission reliability program were applied separately on two case studies. The transmission networks are expanded first without dispersed devices and then with dispersed devices. The differences in the transmission investments and transmission losses between the with and without expansions when properly discounted are the transmission credits of dispersed devices. Energy limitation of dispersed storage and non-coincidence of system and local peak loads are qualitatively reviewed regarding their effect on transmission credits. Study results indicate that the overhead transmission credit of dispersed power plants is in the range of $66 to $133 per kW of installed capacity. In situations where underground cables could be deferred, the credit could be as high as 250 $/kW. This transmission credit compares with the national average capital cost of $110 of transmission investment per kW of generation addition derived from Electrical World data (September 15, 1977). (ERA citation 05:015698)

EPRI-FP-1173 PC **A11**/MF **A01**
Burns and Roe, Inc., Woodbury, NY.
Conceptual Design of a Gulf Coast Lignite-Fired Atmospheric Fluidized-Bed Power Plant. Final Report.
E. Kimel, S. Panico, J. Armstrong, and J. Wysocki. Sep 79, 246p

The report presents the design and economic comparisons of a nominal 530 MWe net atmospheric fluidized-bed combustion (AFBC) plant and comparable pulverized lignite-fired (PLF) plant with a limestone based flue gas desulfurization (FGD) system. Both plants are mine-mouth installations, located in Freestone County, Texas, and designed to burn Texas lignite, with a higher heating value of 6500 Btu/lb and a sulfur content of 1%. (ERA citation 05:013490)

FE-2215-12 PC **A13**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Critical Contributions in MHD Power Generation. Quarterly Technical Progress Report, December 1, 1977-February 28, 1978.
J. F. Louis. Mar 78, 286p
Contract EX-76-C-01-2215

Research and development in open-cycle coal-fired MHD power generation is described. The scope and objectives of the MIT program are: (1) establish chemical, thermal, and electrical data to guide materials selection, develop improved detail designs, and support performance analyses of MHD electrode modules and insulator materials; (2) parametrically investigate selected electrode properties of critical design importance in chemical, thermal, and electrical environments simulating a coal-fired MHD generator; (3) develop combustion data pertinent to the design of MHD combustors; (4) establish techniques for the analysis and understanding of critical MHD phenomena which have an important bearing on MHD generator performance; such phenomena include interelectrode breakdown, time-dependent behavior, effective plasma properties and plasma inhomogeneities; (5) establish the operating characteristics of an MHD disk generator; (6) continue work on computer techniques for modeling and for design and cost analysis of MHD components and the overall system; (7) integrate the engineering data and design criteria, as applicable, which are developed in the listed tasks into a model of the MHD channel; (8) participate in the US/USSR Cooperative Program in MHD Power Generation; and (9) participate in technical support of the DOE MHD Project Office. Progress in each of these areas is reported. (ERA citation 05:015940)

HIG-79-6 PC **A04**/MF **A01**
Hawaii Inst. of Geophysics, Honolulu.
OTEC-1 Anchor Site Survey. Final Report.
J. F. Campbell, and D. Erlandson. Jun 79, 60p
Contract EY-76-C-03-1093

Three areas were investigated to determine their suitability as anchor sites for the Ocean Thermal Energy Conversion (OTEC) test platform. Required were a flat, 800 to 1500-meter deep bottom with an area 5 km in diameter that was in reasonable proximity of a land based logistics supply station. Of the three areas, Maui terrace, South Point, Hawaii, and Kohala terrace, the latter was best suited for the test site. An additional criterion 30 m of sediment cover had to be abandoned when it became evident that the Kohala terrace area had nowhere more than 5 to 7 meters of sediment. A mass anchor has been suggested rather than a self-setting or implanting anchor to secure the OTEC-1 platform because of the thin sediment cover in the area. Bathymetric data, based on 3.5-kHz reflection records, were contoured and two areas were delineated on the Kohala terrace which met the criteria set previously. Bottom photographs, bottom samples, sediment thickness profiles, a biologic mid-water trawl, current data, temperature profiles and meteorological observations supplied further information concerning the two sites. The southern site at approximately 156 exp 0 10.5'W, 19 exp 0 55.5'N was selected as the most suitable anchor site. (ERA citation 05:013341)

METC-8085-T2 PC **A05**/MF **A01**
TRW, Inc., McLean, VA. Energy Systems Planning Div.
Coal Derived Fuel Gases for Molten Carbonate Fuel Cells.
Nov 79, 91p
Contract EY-77-C-21-8085

This report characterizes product streams from state-of-the-art and future coal gasification systems to guide fuel cell program planners and researchers in establishing performance goals and developing materials that will be compatible with product gases. Specifically, this report describes: the range of raw-gas compositions available from the major classes of coal gasifiers; the degree of gas clean-up achievable with state-of-the-art and future gas clean-up systems; and the energy penalties associated with gas clean-up. The study encompasses fixed-bed, fluid-bed, entrained-bed, and molten salt gasifiers operating with Eastern bituminous and Western subbituminous coals. Gasifiers operating with air and oxygen blowing are evaluated, and the coal gasification product streams are characterized with respect to: major gas stream constituents, e.g., CO, H sub 2 , CO sub 2 , CH sub 4 , N sub 2 , H sub 2 O; major gas stream contaminants, e.g., H sub 2 S, COS, particulates, tars, etc.; and trace element contaminants, e.g., Na, K, V, Cl, Hg, etc. The results indicate that gasifier product raw-gas compositions are influenced by the gasifier type, operating conditions, and coal type. Fixed-bed gasifiers, that do not subject the coal pyrolysis products to temperatures above approximately 1600 exp 0 F, contain significant quantities of tars, oils, organic sulfur compounds and organic nitrogen compounds in the product raw gas.Fluid-bed, entrained-bed, and molten salt gasifiers, that operate at higher temperatures, produce less of these materials. Increasing operating temperature also favors the formation of H sub 2 and CO as compared to CO sub 2 , H sub 2 O and CH sub 4 . Since the presence of H sub 2 and CO is preferred over CH sub 4 for a molten carbonate fuel cell feed, high operating temperatures seem to be indicated for gasifiers operating with molten carbonate fuel cells. (ERA citation 05:012932)

N80-21395/2 PC **A14**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Power Satellite System Definition Study, Volume 4, Phase 2.
Final Report, Jan. - Nov. 1979.
Dec 79, 308p NASA-CR-160565, D180-25461-4
Contract NAS9-15636
Sponsored in Part by DOE.

Results of an overall evaluation of the solar power satellite concept are reported. Specific topics covered include: solid state sandwich configuration; parametric development of reliability design; power distribution system for solid state solar power satellites; multibeam transmission; GEO base system configuration; suppression of the heavy lift launch vehicle trajectory; conceptual design of an offshore space center facility; solar power satellite development and operations scenario; and microwave power transmission technology, advancement, development, and facility requirements.

N80-21755/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Storage Peak Gas-Turbine Power Unit.
B. Tsinkotski. Jan 80, 25p NASA-TM-75757
Contract NASW-3198
Transl. Into English from Period. Polytech. Mech. Eng. (USSR), V. 22, No. 2, 1978 p 95-113. Original Language Document Announced as A79-24507. Transl. By Scientific Translation Service, Santa Barbara, Calif.

A storage gas-turbine power plant using a two-cylinder compressor with intermediate cooling is studied. On the basis of measured characteristics of a .25 Mw compressor computer calculations of the parameters of the loading process of a constant capacity storage unit (05.3 million cu m) were carried out. The required compressor power as a function of time with and without final cooling was computed. Parameters of maximum loading and discharging of the storage unit were calculated, and it was found that for the complete loading of a fully unloaded storage unit, a capacity of 1 to 1.5 million cubic meters is required, depending on the final cooling.

N80-21832/4 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Study of the Effects of Impurities on the Properties of Silicon Materials and Performance of Silicon Solar Cell.
C. T. Sah. Feb 80, 37p NASA-CR-162626, JPL-9950-314
Contract JPL-954685
Prepared for JPL and Doe.

Zinc is a major residue impurity in the preparation of solar grade silicon material by the zinc vapor reduction of silicon tetrachloride. It was found that in order to get a 17 percent AMI cell efficiency, the concentration of the zinc recombination centers in the base region of silicon solar cells must be less than 4 x 10 to the 11th power Zn/cu cm in the p-base n+/p/p+ cell and 7 x 10 to the 11th power Zn/cu cm in the n-base p+/n/n+ cell for a base dopant impurity concentration of 5 x 10 to the 14th power atoms/cu cm. If the base dopant impurity concentration is increased by a factor of 10 to 5 x 10 to the 15th power atoms/cu cm, then the maximum allowable zinc concentration is increased by a factor of about two for a 17 percent AMI efficiency. The thermal equilibrium electron and hole recombination and generation rates at the double acceptor zinc cancers were obtained from previous high field measurements as well as new measurements at zero field. The rates were used in the exact d.c. circuit model to compute the projections.

N80-21833/2 PC **A08**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Phase 2 of the Array Automated Assembly Task for the Low Cost Solar Array Project.
Final Report, 1 Oct. 1978 - 30 Oct. 1979.
R. B. Campbell, J. R. Davis, J. W. Ostroski, P. Rai-choudhury, and A. Rohatgi. 1979, 151p
NASA-CR-162628, DOE/JPL-954873-79/08

Contracts NAS7-100, JPL-954873
Prepared for JPL and DOE.

The process sequence for the fabrication of dendritic web silicon into solar panels was modified to include aluminum back surface field formation. Plasma etching was found to be a feasible technique for pre-diffusion cleaning of the web. Several contacting systems were studied. The total plated Pd-Ni system was not compatible with the process sequence; however, the evaporated TiPd-electroplated Cu system was shown stable under life testing. Ultrasonic bonding parameters were determined for various interconnect and contact metals but the yield of the process was not sufficiently high to use for module fabrication at this time. Over 400 solar cells were fabricated according to the modified sequence. No sub-process incompatibility was seen. These cells were used to fabricate four demonstration modules. A cost analysis of the modified process sequence resulted in a selling price of $0.75/peak watt.

N80-21824/0 PC **A13/MF A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Effect of Impurities and Processing on Silicon Solar Cells. Volume 1: Characterization Methods for Impurities in Silicon and Impurity Effects Data Base.
Quarterly Report.
R. H. Hopkins, J. R. Davis, A. Rohatgi, R. B. Campbell, and P. D. Blais. Jan 80, 296p NASA-CR-162627, DOE/JPL-954331-80/9
Contract JPL-954331
Prepared for JPL and DOE.

Two major topics are treated: methods to measure and evaluate impurity effects in silicon and comprehensive tabulations of data derived during the study. Discussions of deep level spectroscopy, detailed dark I-V measurements, recombination lifetime determination, scanned laser photo-response, conventional solar cell I-V techniques, and descriptions of silicon chemical analysis are presented and discussed. The tabulated data include lists of impurity segregation coefficients, ingot impurity analyses and estimated concentrations, typical deep level impurity spectra, photoconductive and open circuit decay lifetimes for individual metal-doped ingots, and a complete tabulation of the cell I-V characteristics of nearly 200 ingots.

N80-21880/3 PC **A07/MF A01**
Technische Univ., Berlin (Germany, F.R.). Institut fuer Luft- und Raumfahrt.
Study on European Aspects of Solar Power Satellites, Volume 1.
Final Report.
J. Ruth, and W. Westphal. Jun 79, 137p ESA-CR(P)-1266
Contract ESA-3705/78-F-DK(SC)

A study on implications of the potential electricity supply for Western Europe by Solar Power Satellites (SPS) and of their implementation problems around the turn of the century is presented. Three objectives in this scope have been pursued to provide a decision platform for on-going study and research activities: (1) to establish an information base including relevant data collection and basic SPS-systems understanding; (2) to identify and preliminary assess specific European problems of SPS utilization; and (3) to accomplish recommendations for early study activities of particular European concern. The last item is directly derived from the evaluations of the second study objective and must be seen in the context with SPS activities of the USA. It is concluded that the special European environment calls for special European utilization feasibility analyses, while the principal technical feasibility of a SPS-system should be taken over from U.S. studies. Moreover, if the USA stops its activities, an implementation of a SPS-system for Western Europe would be impractical in the considered time frame (2000-2030).

N80-21881/1 PC **A03/MF A01**
Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.
Torsional Oscillations of the Rotor Disc for Horizontal Axis Wind Turbines with Hinged or Teetered Blades, Part 12.
L. S. Hultgren. 23 Aug 79, 39p FFA-TN-AU-1499-PT-12
Contract SWEDBESD-5061.012

The coupling of torsional oscillations of the rotor disc and the blade motions was analyzed for horizontal axis wind turbine hinged or teetered blades. The blades and the tower were assumed to be perfectly rigid. The vibrational analysis was linear and the antisymmetric blade flapping motion was found be decoupled. Expressions for the eigenfrequencies of the system were obtained. Analytical solutions were constructed for forced vibrations due to gravity, wind shear and tower shadow. Large resonant torsional responses were found to be possible. Numerical examples are presented.

N80-22083/3 PC **A02/MF A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Potentialities of TEC Topping: A Simplified View of Parametric Effects.
J. F. Morris. 1980, 21p NASA-TM-81468, DOE/NASA/1062-80/5
Contract EC-77-A-31-1062
Presented at Intern. Conf. On Plasma Sci., Madison, Wisc., 19-21 May 1980; Sponsored by IEEE.

An examination of the benefits of thermionic-energy-conversion (TEC)-topped power plants and methods of increasing conversion efficiency are discussed. Reductions in the cost of TEC modules yield direct decreases in the cost of electricity (COE) from TEC-topped central station power plants. Simplified COE, overall-efficiency charts presented illustrate this trend. Additional capital-cost diminution results from designing more compact furnaces with considerably increased heat transfer rates allowable and desirable for high temperature TEC and heat pipes. Such improvements can evolve of the protection from hot corrosion and slag as well as the thermal expansion compatibilities offered by silicon-carbide clads on TEC-heating surfaces. Greater efficiencies and far fewer modules are possible with high-temperature, high-power-density TEC: This decreases capital and fuel costs much more and substantially increases electric power outputs for fixed fuel inputs. In addition to more electricity, less pollution, and lower costs, TEC topping used directly in coal-combustion products contributes balance-of-payment gains.

ORO-5669-T2 PC **A05/MF A01**
Temple Univ., Philadelphia, PA. Dept. of Chemistry.
Protonic Conduction Wave Energy Converter. Final Report, January 1, 1978-December 31, 1978.
R. E. Salomon. Feb 79, 83p
Contract ET-78-S-05-5669

An initial study of the feasibility of using electrochemical hydrogen concentration cells with protonic conductors for the conversion of ocean wave energy into electricity has been carried out. The system considered uses the potential energy of waves or ocean swells to alternately compress and expand hydrogen gas which thereby drives a concentration cell. A theoretical analysis of four idealized embodiments of the device, incorporated within a taut-moored buoy, has shown that the key to efficient conversion is sufficiently low electrode and electrolyte resistance. One of the pivotal assumptions in this analysis is that the system can respond in the time of an ocean wave period to the pressure oscillations. Accordingly, this assumption was tested experimentally using Nafion and filter paper impregnated with hydrochloric acid as the electrolytes and platinum as the electrode material. The assumption was experimentally validated and the power delivered by these cells under conditions of simulated three foot waves was measured as a function of load resistancy and temperature. The power exhibited a peak as a function of load resistance, increased with a rise in temperature and sharply increased with an enhancement of the water content of the Nafion. The two latter observations are indicative of the importancy of low cell resistance in achieving high conversion efficiencies. By combining the experimental results on power and cell resistance with results of the theoretical analysis of a potential system it is concluded that 250 watts can be obtained from one square meter of ocean in a three foot sea. This 25% conversion efficiency can be obtained with presently available materials (Nafion and porous platinum electrodes.). (ERA citation 05:013438)

PAT-APPL-6-018 211 PC **A02/MF A01**
Department of Energy, Washington, DC.
Fuel Cell Oxygen Electrode.
Patent Application,
H. R. Shanks, A. J. Bevolo, G. C. Danielson, and M. F. Weber. Filed 7 Mar 79, 10p
Contract W-7405-ENG-82
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An oxygen electrode for a fuel cell utilizing an acid electrolyte has a substrate of an alkali metal tungsten bronze of the formula: A/sub x/WO sub 3 where A is an alkali metal and x is at least 0.2, which is covered with a thin layer of platinum tungsten bronze of the formula: Pt/sub y/WO sub 3 where y is at least 0.8. (ERA citation 05:020767)

PATENT-4 191 505
Not available NTIS
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Wind Wheel Electric Power Generator.
Patent,
J. W. Kaufman. Filed 24 Feb 78, patented 4 Mar 80, 8p N80-21828/2, PAT-APPL-880 726
Supersedes PAT-APPL-880 726-78, N78-22469 (16 - 13, p 2137).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Wind wheel electric power generator apparatus includes a housing rotatably mounted upon a vertical support column. Primary and auxiliary funnel-type, venturi ducts are fixed onto the housing for capturing wind currents and conducting to a bladed wheel adapted to be operatively connected with the generator apparatus. Additional air flows are also conducted onto the bladed wheel; all of the air flows positively effecting rotation of the wheel in a cumulative manner. The auxiliary ducts are disposed at an acute angle with respect to the longitudinal axis of the housing, and this feature, together with the rotatability of the housing and the ducts, permits capture of wind currents within a variable directional range.

PB80-115256 PC **E12/MF E12**
New Mexico Univ., Albuquerque. Technology Application Center.
Solar Thermal Power Generation: A Bibliography with Abstracts. Quarterly Update January-March 1979,
Sudhir Dhawan. Jun 79, 97p TAC-STPG-79-001
Contract NASw-2936
See also Quarterly Update Apr-Jun 79, PB80-173990.

This bibliographic series cites and abstracts literature and technical papers on electrical power generation primarily through solar thermal processes. The quarterly volumes are divided into ten categories: Energy Overviews, Solar Overviews, Economics and Law, Thermal Power, Thermionics, Ocean Thermal Differential, Wind Conversion, Biomass, Residential Systems, and Large Scale Photovoltaic Hydrogen Production and Other. Each quarterly volume is compiled from a wide variety of data bases, report literature, technical briefs, journal articles and other traditional and non-traditional sources. The Technology Application Center maintains a library containing many of the articles and publications referenced in the series.

PB80-170665 PC **A07/MF A01**
Montana State Univ., Bozeman. Dept. of Mechanical Engineering.
Technical Feasibility Study of a Wind Energy Conversion System Based on the Tracked Vehicle-Airfoil Concept.
Quarterly progress rept. no. 3,
R. E. Powe, H. W. Townes, and D. O. Blackketter. 31 Oct 73, 150p NSF-RA-N-73-329, NSF-RANN/SE/GI-39415/PR/73/3
Grant NSF-GI-39415
See also report dated 31 Jul 74, PB80-170681.

First phase results of a detailed technical feasibility study of a wind energy conversion system based on the tracked vehicle-airfoil concept are described. Basically, it is anticipated that the system will consist of airfoils mounted vertically on car-

riages which will move around a horizontal, closed track system. The orientation of the airfoils, relative to the wind, will be automatically controlled to enable a maximum power extraction from the wind. During this first phase of the study, the performance specifications for the major system components required for converting wind energy to mechanical energy have been established, and the interface requirements between these components have been identified. Several possible alternatives for meeting these components and interface criteria have been selected, and a detailed study of the aerodynamic performance of the airfoils is reported.

PB80-170673 PC **A04**/MF **A01**
Montana State Univ., Bozeman. Dept. of Mechanical Engineering.
Technical Feasibility Study of a Wind Energy Conversion System Based on the Tracked Vehicle-Airfoil Concept.
Quarterly progress rept. no. 1, 1 Jan-31 Mar 74,
R. E. Powe, H. W. Townes, and E. H. Bishop. 30 Apr 74, 57p NSF-RA-N-74-386, NSF-RANN/SE/GI-39415/PR/74/1
Grant NSF-GI-39415
See also report dated 31 Oct 73, PB80-170665.

A theoretical study of the expected output of various wind energy conversion devices has been made. It is demonstrated analytically that the maximum possible wind energy extraction rate with the tracked vehicle- airfoil device may be as much as 26 percent greater than that for conventional windmills. Also, the alternatives available for the four major subsystems were examined and a specific overall system was selected for more detailed study. A comprehensive mathematical model of this system was developed in order to predict its performance. This model incorporates a search technique to determine optimum carriage speed and airfoil angle of attack for maximum system power extraction. Actual wind spectrum information for a specific geographic location can be used in conjunction with the model to predict energy output from the system over any desired time period.

PB80-170681 PC **A04**/MF **A01**
Montana State Univ., Bozeman. Dept. of Mechanical Engineering.
Technical Feasibility Study of a Wind Energy Conversion System Based on the Tracked Vehicle-Airfoil Concept.
Semi-Annual progress rept. 1 Jan-30 Jun 74,
R. E. Powe, H. W. Townes, E. H. Bishop, and J. Martinell. 31 Jul 74, 55p NSF-RA-N-74-388, NSF-RANN/SE/GI-39415/PR/74/2
Grant NSF-GI-39415
See also report dated 30 Apr 74, PB80-170673.

Results of a technical feasibility study of a wind energy conversion system based on the tracked vehicle-airfoil concept are described. Specific alternatives for the major system components were selected for detailed analysis, and a comprehensive mathematical model of the resulting system was developed. This model was programmed for solution on a digital computer, and the system operation was simulated under conditions selected to demonstrate the effects of changes in various design parameters. It is shown that a greater power output may be expected from this system than from conventional windmills under similar operating conditions.

PB80-170772 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign. Center for Advanced Computation.
Fuels for Electric Power Generation: Low Sulfur Coal and Enriched Uranium. Proceedings of the Annual Regulatory Information Systems Conference (4th), Energy Problems of Regulated Utilities, September 11, 1974,
Michael Rieber. 1974, 51p NSF-RA-N-74-445
Grant NSF-GI-35821

This report presents some of the results of two studies pertaining to low sulfur coal and nuclear power as energy sources. It is shown that there is considerably less low sulfur coal than the amount indicated in the conventional data supplied by the Bureau of Mines and others. It is indicated that the amount of nuclear power available by 1985 will be considerably less than estimates made by the Atomic Energy Commission and will cost significantly more. The results presented are important in terms of utility decision making with respect to future fuel use and the type of power generating facility. A significant part of the decision to adopt a particular type of generating plant depends upon expected relative fuel costs at the time the plant is due to begin operation. Much tabular data are presented on the estimates of resources and recoverable reserves of coal. Factors affecting these estimates are reviewed. Air quality standards are discussed and the costs of nuclear power are considered at length.

PB80-170806 PC **A09**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC. Applied Ecology Dept.
Development of Small Hydroelectric Projects in Appalachia.
Final rept.,
John L. Warren. Dec 79, 182p RTI/1788/00-01F, ARC-78-204/NC-6521
Contract ARC-78-204/NC-6521
Sponsored in part by North Carolina State Dept. of Administration, Raleigh. Prepared in cooperation with Wind and Water Power, Harrisville, NH.

The project identified small hydroelectric sites in the Appalachian counties of North Carolina with development potential. From this list, three sites, North Fork Reservoir Dam owned by the City of Asheville, the Town of Highlands Dam, and Capitola Dam were chosen for further detailed feasibility analyses. Based on (1) detailed inspection of the sites, (2) analysis of construction costs, and (3) identification of generic problems associated with small hydro, a cost-effectiveness analysis of the financial feasibility of each site will be prepared. As part of this task, the effects of power generation on existing operations at each site and the potential power customers will be identified.

PB80-171218 PC **A05**/MF **A01**
Nevada Univ. System, Reno. Water Resources Center.
Hybrid Energy System: Wind and Water,
J. W. Fordham, M. K. Peck, R. McMullen, and A. B. Cunningham. Feb 80, 78p PUB-41062, W80-04502, OWRT-B-086-NEV(1)
Contract DI-14-31-0001-6098

The potential for using wind together with hydro generation to meet small area energy demands was examined and a prototype wind-hydro system was modeled for a Nevada site to determine optimum component sizes and operation. The wind-hydro system is designed as an alternative to conventional power generation methods especially in remote areas where the construction of transmission lines is not economically practical. The system includes a reservoir to catch as much runoff as possible, a hydroelectric generation plant, a wind turbine, and a generator. To offset the variability of energy supply from the wind, energy conversion systems (WECS) drive recharge pumps to the upstream reservoir where water is stored to be released to drive the hydroelectric generators when needed for a steady energy supply. Costs and benefits are examined in a generalized manner for six preliminary designs then in detail for a wind-hydro system located on Slide Mountain in Nevada.

PB80-171291 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Near Field Performance of Staged Diffusers in Shallow Water,
E. Eric Adams, and John H. Trowbridge. Apr 79, 188p MIT-EL-79-015
Sponsored in part by New England Power Service Co., and Eastern Utilities Associates.

The performance of a staged diffuser in shallow water of constant depth has been analyzed previously by treating the diffuser as a continuously distributed line source of momentum (Almquist & Stolzenbach, 1976). This theory has been reviewed and extended to consider the case of a sloping bottom and to compute the external (entrainment) flow field set up by the diffuser. In these analyses the important parameters are the gross diffuser velocity, water depth and diffuser length. Length scales are on the order of one diffuser length, and the characteristics of the individual jets are assumed to be insignificant in describing diffuser performance at this level. A more detailed analysis of staged diffuser performance in the near field is useful if one wishes to describe the temperatures and shear stresses experienced by organisms that are entrained into the diffuser plume.

PB80-173990 PC **E12**/MF **E12**
New Mexico Univ., Albuquerque. Technology Application Center.
Solar Thermal Power Generation: A Bibliography with Abstracts. Quarterly Update April-June 1979,
Sudhir Dhawan. Oct 79, 131p TAC-STPG-79-002
Contract NASw-2936
See also Quarterly Update Jan-Mar 79, PB80-115256.

This bibliographic series cites and abstracts literature and technical papers on electrical power generation primarily through solar thermal processes. The quarterly volumes are divided into ten categories: Energy Overviews, Solar Overviews, Economics and Law, Thermal Power, Thermionics, Ocean Thermal Differential, Wind Conversion, Biomass, Residential Systems, and Large Scale Photovoltaic Hydrogen Production and Other. Each quarterly volume is compiled from a wide variety of data bases, report literature, technical briefs, journal articles and other traditional and non-traditional sources. The Technology Application Center maintains a library containing many of the articles and publications referenced in the series.

PB80-174154 PC **A05**/MF **A01**
Perkin-Elmer Corp., Norwalk, CT. Electro-Optical Div.
The Use of Inhomogeneous Metal Dielectric Films as Selective Absorbing Surfaces for Solar Energy Conversion Panels.
Final rept.
Nov 76, 97p 13223, NSF/RA-761852
Grant NSF-AER74-16330

Inhomogeneous metal/dielectric films have been investigated for use as selective absorbers of solar energy. These devices exhibit a high degree of absorption (alpha) for the solar spectrum as well as very high reflection (low emissivity, epsilon) at IR wavelengths in the blackbody spectrum defined by the device's operating temperature. Much of the research was centered on investigations and selections of film materials that not only yielded a high alpha/epsilon ratio, but also survived a high temperature (450C) air environment and were compatible with economical stainless-steel substrates. The inhomogeneous film is graded continuously from 100% metal/0% dielectric at the substrate boundary to 0% metal/100% dielectric at the air boundary using a simultaneous deposition. The functional form of the composition gradient is electronically controlled. The effects of varying the composition gradient were studied on both theoretical and experimental levels to optimize the optical parameters in the cut-off region and determine production latitudes.

PB80-174345 PC **A09**/MF **A01**
Pennsylvania State Univ., University Park. Center for the Study of Environmental Policy.
Public Reaction to Proposed Energy Facilities: A Sociological Analysis.
Technical rept. (Final),
Frank Clemente, Matthew Hastings, Margaret Cawley, and Terry A. Ferrar. Sep 78, 185p NSF/PRA-7681994/1
Grant NSF-PRA76-81994

This study provides an interpretation of the role and behavior of key groups in the Pennsylvania Energy Park Controversy where unfavorable public reaction developed concerning the concentration of electrical generating capacity at a single geographic site. The energy parks proposed for the State were to consist of several power plants, both nuclear and coal-fired. Ten potential sites within Pennsylvania, all predominantly rural, were identified as possible construction sites. A methodology was used which incorporated public opinion towards these sites gathered from information meetings, letter writing, and from a variety of perspectives within the context of the issue.

PB80-175185 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.

Peat as a Fuel at the Proposed Central Maine Power Company 600 MW Plant. Volume I.
Final rept.,
William J. Jones. Dec 79, 187p MIT-EL-79-012
Sponsored in part by Central Maine Power Co., Augusta.

The Central Maine Power Company is planning to construct a 600-megawatt electricity-generating plant at Sears Island, Maine. The plant, as presently conceived, is to employ coal as the input energy fuel form. It has been suggested that peat, which is present in sizeable quantities within the boundaries of the state, be considered instead of coal which has to be imported from other states. This report contains the findings and recommendations resulting from an exploratory assessment of the technical feasibility of using peat instead of coal, and of the economic and institutional issues that may be involved as a result of such a substitution. It is intended for a broad spectrum of readers.

SAN-1570-1-T1 PC **A12**/MF **A01**
TRW Systems and Energy, Redondo Beach, CA.
Ocean Thermal Energy Conversion (OTEC) Power System Development Utilizing Advanced, High-Performance Heat Transfer Techniques. Volume 1. Conceptual Design Report.
12 May 78, 265p
Contract EG-77-C-03-1570

The objective of this project is the development of a preliminary design for a full-sized, closed cycle, ammonia power system module for the 100 MWe OTEC Demonstration Plant. In turn, this Demonstration Plant is to demonstrate, by 1984, the operation and performance of an ocean thermal power plant having sufficiently advanced heat exchanger design to project economic viability for commercial utilization in the late 1980's and beyond. Included in this power system development are the preliminary designs for a proof-of-concept pilot plant and test article heat exchangers which are scaled in such a manner as to support a logically sequential, relatively low-cost development of the full-scale power system module. The conceptual designs are presented for the Demonstration Plant power module, the proof-of-concept pilot plant, and for a pair of test article heat exchangers. Costs associated with the design, development, fabrication, checkout, delivery, installation, and operation are included. The accompanying design and producibility studies on the full-scale power system module project the performance/economics for the commercial plant. This section of the report describes the full-size power system module, and summarizes the design parameters and associated costs for the Demonstration Plant module (prototype) and projects costs for commercial plants in production. The material presented is directed primarily toward the surface platform/ship basic reference hull designated for use during conceptual design; however, other containment vessels were considered during the design effort so that the optimum power system would not be unduly influenced or restricted. (ERA citation 05:015319)

SAN-1570-2/1 PC **A21**/MF **A01**
TRW Systems and Energy, Redondo Beach, CA.
Ocean Thermal Energy Conversion (OTEC). Power System Development. Preliminary Design Report, Final.
4 Dec 78, 489p
Contract EG-77-C-03-1570

The preliminary design of the 10 MWe OTEC power module and the 200 kWe test articles is given in detail. System operation and performance; power system cost estimates; 10 MWe heat exchangers; 200 kWe heat exchanger articles; biofouling control;ammonia leak detection, and leak repair; rotating machinery; support subsystem; instrumentation and control; electrical subsystem; installation approach; net energy and resource analysis; and operability, maintainability, and safety are discussed. The conceptual design of the 40 MWe electrical power system includes four or five 10 MWe modules as designed for the 10 MWe pilot plant. (ERA citation 05:013342)

SAN-1572-T1 PC **A06**/MF **A01**
Burbank Public Service Dept., CA.
High Geothermal Energy Utilization Geothermal/Fossil Hybrid Power Cycle: A Preliminary Investigation.
R. L. Grijalva, and S. K. Sanemitsu. Nov 78, 107p
Contract EG-77-G-03-1572

Combining geothermal and fossil fuel energy into the so-called hybrid cycle is compared with a state-of-the-art double-flash geothermal power cycle using resources which vary from 429 exp 0 K (312 exp 0 F) to 588 exp 0 K (598 exp 0 F). It is demonstrated that a hybrid plant can compete thermodynamically with the combined output from both a fossil-fired and a geothermal plant operating separately. Economic comparison of the hybrid and double-flash cycles is outlined, and results are presented that indicate the performance of marginal hydrothermal resources may be improved enough to compete with existing power cycles on a cost basis. It is also concluded that on a site-specific basis a hybrid cycle is capable of complementing double-flash cycles at large-capacity resources, and can operate in a cycling load mode at constant geothermal fluid flow rate. (ERA citation 05:011771)

SAN-2207-3 PC **A04**/MF **A01**
Motorola, Inc., Phoenix, AZ. Solar Energy Dept.
Thin Film Polycrystalline Silicon Solar Cells. Quarterly Report No. 3, 1 April 1979-30 June 1979.
K. R. Sarma, M. J. Rice, R. Legge, R. W. Gurtler, and W. C. Ramsey. 1979, 72p
Contract ET-78-C-03-2207

During this quarter the effects of molybdenum substrate smoothness on the shear separation process were investigated. By Auger analysis of the substrates, shear separation was found to occur in the silicon film very near the MoSi sub 2 -Si interface. A moving substrate EBD system has been designed, fabricated and currently being assembled. Initial experiments have been performed to determine the optimum resistivity for high efficiency cells, and the effects of substrate temperature during deposition and of multiple gettering cycles on solar cell efficiency. Substrate temperatures between 1050 exp 0 C to 1150 exp 0 C did not appear to influence cell efficiency parameters. Because of the limited number of experiments performed to date, the optimum doping level and the benefits of multiple gettering cycles could not be conclusively determined. (ERA citation 05:015167)

SAND-79-1873C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
SOLSTOR Results for a Photovoltaic/Battery System with Time-of-Day Pricing and Sellback.
B. C. Caskey, D. L. Caskey, and E. A. Aronson.
1980, 5p CONF-800101-2
Contract EY-76-C-04-0789
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

The Sandia Laboratories' optimizing computer code, SOLSTOR, has been utilized to investigate the role of battery storage in a residential flat plate photovoltaic (PV) system. The system is connected to the utility grid and time-of-day pricing and sellback policies are considered. The study assumes that the 1986 PV module cost goals will be met, and hence PV systems will be competitive with grid electricity. A range of battery costs is included. Systems installed in three cities (Phoenix, AZ, New York, NY, and Columbia, MO) were optimized based on minimizing the 20 year life cycle energy cost for a typical all-electric single family dwelling. The results show that the usefulness of batteries is a strong function of the battery costs, economic conditions, time-of-day pricing ratio, and the sellback ratio. At about $100/kWh, batteries can generally lower life cycle costs. Also, the synergism of PV arrays and batteries can result in larger PV arrays for the optimized system. In particular, it was determined that whenever either the sellback ratio was 0.5 or less, or the peak/off-peak electric rate ratio was greater than 3:1, batteries were an economic asset in the system. (ERA citation 05:011607)

SAND-79-7020(V.2) PC **A10**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Application Analysis and Photovoltaic System Conceptual Design for Service/Commercial/Institutional and Industrial Sectors. Volume II. Technical Report. Final Report.
R. A. Whisnant, C. B. Morrison, N. G. Staffa, and R. D. Alberts. Dec 79, 219p
Contract EY-76-C-04-0789

It is the objective of this study to examine the nature of potential applications of photovoltaics in the SCII sectors and to suggest the most appropriate areas for development of photovoltaic markets within those sectors. The analysis consists of four tasks: (1) The two-digit Standard Industrial Classification Codes have been used to describe the universe of applications that must be considered. Data on the attributes of these applications that are germane to solar photovoltaic systems application have been identified and acquired, and the figure of merit, utilizing the collected data, that indicates the relative photovoltaic potential for displacement of conventionally generated electricity of the various applications has been devised and applied. (2) The expected profitability of photovoltaic application is determined from the discounted future costs of conventional energy sources, capital costs, and projected operating and maintenance costs over the life of the system. This is combined with the energy consumption of the application to obtain an estimate of the energy market potential. (3) The application ranking and subjective evaluations of market size, diversity, and public exposure are used to select five applications and their locations for design of a suitable photovoltaic system. (4) For each of the selected applications, the various relevant characteristics are identified, potential photovoltaic system configurations are identified, and performance and economic models are used to design a representative system. The design of the selected system is described and documented with schematics, drawings, specifications, and cost estimates. (ERA citation 05:015239)

SAND-79-7048 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
Novel Solar Cell Concentrator Photovoltaic Converter System. Final Report, April 1979.
L. W. James, H. A. Vander Plas, and R. L. Moon.
Dec 79, 91p
Contract EY-76-C-04-0789

Attainment of photovoltaic conversion efficiencies greater than 25% to 30%, thought necessary to make concentrator photovoltaics economical, seems possible if the solar spectrum is more efficiently used by splitting the spectrum and using solar cells of different bandgaps. For initial work on multi-bandgap concentrator solar cells, the spectrum has been split by an optical filter which transmits light above 1.6 eV and below 1.1 eV and reflects light between 1.1 and 1.6 eV. Theoretical modeling of possible conversion efficiencies led to the choice of the filter bandpass energies and practical solar cell fabrication considerations have led to the choice of silicon and the Al/sub x/Ga/sub 1-x/As system for initial development work. Special silicon concentrator solar cells with a p exp + :n-:n exp + structure have been designed for this application and have attained apparent cell converson efficiencies of 16.2% at a current ratio of 455 suns. An Al sub 0 sub 93 Ga sub 0 sub 07 As/Al sub 0 sub 17 Ga sub 0 sub 83 As solar cell with a bandgap near 1.6 eV has attained a cell converson efficiency of 20.4% at a flux concentration of 525 suns. These cells have been packaged and combined with the spectrum splitting filter to give conversion efficiencies at 50 exp 0 C, including the filter and the cells, of 27.0% at 113 suns and 26.0% at 489 suns. (ERA citation 05:015169)

SAND-79-7128 PC **A02**/MF **A01**
Completion Technology Co., Houston, TX.
Predicting Injector Performance at the Proposed Magma-SDG and E Fifty Megawatt Geothermal Power Plant.
R. M. Jorda. Feb 80, 25p
Contract EY-76-C-04-0789

The spent geothermal brine will be treated in a sludge-bed clarifier, followed by filtration through rapid mixed-media filters for suspended solids removal. The injection water treating system and the reinjection well are scheduled to be ready for testing by late Spring, 1979. Some insight is provided to the question of the injection test duration necessary to provide an assessment of the well's long-term injection capability. An advanced method is included for assessing changes in injection well receptivity, the Injection Performance Map (IPM). Data are included which suggest that three to four

months' continuous operation with properly treated injection water may be sufficient to forecast the well's long-term injection potential. (ERA citation 05:015566)

SAND-80-7005C PC **A04**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Cleaning Agents and Techniques for Concentrating Solar Collectors.
V. L. Morris. 1980, 65p CONF-800220-2
Contract EY-76-C-04-0789
Solar reflective materials workshop, San Francisco, CA, USA, 12 Feb 1980.

Tests were conducted to determine the nature of the soil which is irreversibly deposited on solar collectors during environmental exposure. Methods of removing this soil were investigated. The mechanism of attachment of the soil to the surface was determined as a potential aid to cleaning agent formulation. Reflector specimens were environmentally exposed at several industrial sites. Three types of reflector surfaces were studied: second surface silvered glass, aluminized FEK-244 film on aluminum substrate, and RTV 670 on aluminum. Cleaning procedures were evaluated by microscopic examination of the solid surfaces before and after cleaning by measurement of specular reflectance. The effect of local environmental degradation specific to an industrial process on solar collector surfaces was investigated. (ERA citation 05:015446)

WASH-2330-78/4(V.2) PC **A14**/MF **A01**
Westinghouse Electric Corp., East Pittsburgh, PA.
Design Study and Economic Assessment of Multi-Unit Offshore Wind Energy Conversion Systems Application. Volume II. Apparatus Designs and Costs. Final Report.
L. A. Kilar. 14 Jun 79, 310p
Contract EX-76-C-01-2330

Parametric designs and companion cost functions are presented for each major component of an offshore wind energy conversion system (OWECS). These are (1) the support platforms, (2) the wind turbine generator (WTG) plants, and (3) the electrical energy collection and transmission system including (4) substations. A backup hydrogen energy delivery system for extremely remote or deep water sites was also evaluated. Costs are presented for fabricating, transporting, installing, operating, and maintaining each of these components. (ERA citation 05:013482)

10C. Energy Storage

AD-A083 102/4 PC **A02**/MF **A01**
Naval Surface Weapons Center Silver Spring MD
Safety Test on AN/PRC-96 Transmitter.
Final rept.,
R. F. Bis, D. L. Warburton, and C. F.Freeman. 30 Nov 79, 23p Rept no. NSWC/TR-79-451

Lithium Sulfur Dioxide batteries are used to power an emergency radio transmitter carried aboard naval submarines. These batteries can release undesirable gasses if venting occurs. A limited investigation was undertaken to determine the types and quantities of gasses released from these batteries to establish under what conditions the transmitter can be safely stored aboard submarines. (Author)

AD-A083 302/0 MF **A01**
Rockwell International Canoga Park CA Rocketdyne Div
High Energy Storage Flywheel Test Program.
Final rept.,
D. R. Hodson. 28 Jan 80, 146p Rept no. RI/RD78-207-1
Contract DAAG53-75-C-0278
Availability: Microfiche copies only.

The RS-31 Flywheel System is an energy storage device which is accelerated by an AVCO LYCOMING T55-L-7C 2930 SHP drive engine to 14,506 RPM. The two contra-rotating double disk rotors of the flywheel module have an inertia of 320,176 sq. in.-lbs storing 30 KW-HRS of energy at design speed. This was a Research & Development test activity designed to explore and verify design predictions of system performance. (Author)

AD-A083 434/1 PC **A03**/MF **A01**
Tennessee Univ Knoxville Dept of Chemistry
Evaluation of Low Melting Halide Systems for Battery Applications.
Interim rept. 1 Sep 78-31 Aug 79,
Gleb Mamantov. Nov 79, 46p AFAPL-TR-79-2124
Contract F33615-78-C-2075

This three year program involves evaluation of selected low temperature molten salt solvent systems containing inorganic and/or organic chlorides and bromides for battery applications. The research involves determination of the liquidus temperatures, the specific electrical conductivity, and the electrochemical span of selected halide systems. Characterization of the solvent species by Raman spectroscopy, vapor pressure measurements, and the electrochemical study of a few cathode and anode systems will be undertaken for the most promising solvent systems.

ANL/CNSV-TM-28 PC **A02**/MF **A01**
Argonne National Lab., IL.
Procedures for Safe Handling of off-Gases from Electric Vehicle Lead-Acid Batteries During Overcharge.
S. J. LaBelle, M. H. Bhattacharyya, R. O. Loutfy, and R. Varma. 25 Jan 80, 20p
Contract W-31-109-ENG-38

The potential for generation of toxic gases from lead-acid batteries has long been recognized. Prior to the current interest in electric vehicles, there were no studies specificaly oriented to toxic gas release from traction batteries, however. As the Department of Energy Demonstration Project (in the Electric and Hybrid Vehicle Program) progresses, available data from past studies and parallel health effects programs must be digested into guidance to the drivers and maintenance personnel, tailored to their contact with electric vehicles. The basic aspects of lead-acid battery operation, vehicle use, and health effects of stibine and arsine to provide electric vehicle users with the information behind the judgment that vehicle operation and testing may proceed are presented. Specifically, it is concluded that stibine generation or arsine generation at rapid enough rates to induce acute toxic response is not at all likely. Procedures to guard against low-level exposure until more definitive data on ambient concentrations of the gases are collected are presented for both charging the batteries and driving the vehicles. A research plan to collect additional quantitative data from electric traction batteries is presented. (ERA citation 05:013862)

CONF-790328-P3 PC **A08**/MF **A01**
Trinity Univ., San Antonio, TX.
Proceedings of Solar Energy Storage Options. Volume II.
M. B. McCarthy. 1979, 154p
Contracts W-7405-ENG-26, W-31-109-ENG-
Solar energy storage options workshop, San Antonio, TX, USA, 18 Mar 1979.

Separate abstracts were prepared for each of the six included sections. (ERA citation 05:011700)

DSE-4042-T21 PC **A03**/MF **A01**
Gould, Inc., Rolling Meadows, IL. Gould Labs.
Regenerative Mode Photo Electrochemical Cells in Molten Salt Electrolytes. 1ST Four Monthly Report (1/31/80).
1980, 40p
Contract EG-77-C-01-4042

The most promising photoelectrodes selected for use in the butyl pyridinium chloride-aluminum chloride room temperature molten salt are n-type silicon, gallium arsenide and cadmium telluride. The solubilities of these semiconductors are low, and their conduction and valence band edges are favorably located. Cadmium selenide and sulfide showed significant solubility in the melt, and the conduction band edge for p-type cadmium telluride was too close to the aluminum deposition potential. Several reversible redox couples have been identified, which could potentially be used in a photoelectrochemical cell. These include W exp 5+ /W exp 6+ and Eu exp 2+ /Eu exp 3+ as well as ferrocene and its derivatives. (ERA citation 05:015191)

LA-7885-M PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
1-GWh Diurnal Load-Leveling Superconducting Magnetic Energy Storage System Reference Design.
J. D. Rogers, W. V. Hassenzahl, and R. I. Schermer. Sep 79, 74p
Contract W-7405-ENG-36

A point reference design has been completed for a 1-GWh Superconducting Magnetic Energy Storage system. The system is for electric utility diurnal load-leveling but can also function to meet much faster power demands including dynamic stabilization. This study explores several concepts of design not previously considered in the same detail as treated here. Because the study is for a point design, optimization in all respects is not complete. This report examines aspects of the coil, the superconductor supported off of the dewar shell, the dewar shell, and its configuration and stresses, the underground excavation and construction for holding the superconducting coil and its dewar, the helium refrigeration system, the electrical converter system, the vacuum system, the guard coil, and the costs. This report is divided into two major portions. The first is a general treatment of the work and the second is seven detailed technical appendices issued as separate reports. The information presented on the aluminum stabilizer for the conductor, on the excavation, and on the converter is based upon industrial studies contracted for this work. (ERA citation 05:014560)

NP-24328 PC **A07**/MF **A01**
Technische Univ., Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenwesen.
Thermal Characteristics of Magnesia Rocks for Low-Tariff Storage Heaters and Their Effects on the Geometry of the Storage Material.
A. Eschner. 14 Jun 78, 138p
In German.Thesis.
U.S. Sales Only.

Magnesia rocks are well suited for electrical storage heating systems due to their high thermal conductivity. The paper investigates the physical properties of these rocks: specific heat, thermal conductivity as a function of temperature, effects of porosity and of the sintering process. The functioning of a storage heater is described by a simple plate model. The theoretical values are checked experimentally, and good agreement is found. The degree of utilization was investigated for test objects with different geometries. (ERA citation 05:015848)

N80-21762/3 PC **A0**[illegible] MF **A01**
National Centre of Tribology, Risley (England). European Space Tribology Lab.
Thermal Vacuum Accelerated Life Test on a Prototype Teldix Single-Gimballed Momentum Wheel.
K. Parker, and J. C. Anderson. Jun 79, 48p ESA-CR(P)-1268
Contract ESA-3368/77-NL-MD

A prototype TELDIX single-gimballed momentum wheel (SGMW) has been tested in vacuum at isothermal temperatures and with various thermal gradients. The mechanism consists of a momentum wheel which is oscillated in one plane through + or - 5 deg angular motion by a stepper motor giving a nominal step size of 0.031 deg. During the accelerated life tests a total of 1.5 x 10 to the 7th power steps were carried out which represents more than 150 times the number of steps which would occur in a 7 year lifetime of operation in a communications satellite. Detailed measurements on the motion of the stepper motor were taken at intervals during the test and the distribution of step sizes presented as a histogram evaluation. Several minor variations in step size distribution occurred during the various tests which did not correlate with temperature level. The electrical performance of both the momentum wheel motor and stepper motor showed no change during the tests. The amount of wear on the teeth of the stepper motor was found to be consistent with the low torque exerted by the gimbal system and was insufficient to alter the tooth profile. Steel balls had been fitted to the gimbal bearings. Duroid cages were used and the transfer of lubricant from these cages had minimized steel wear in the bearings.

N80-21882/9 PC **A07**/MF **A01**
Danish Research Center for Applied Electronics, Hoersholm.

Prediction of the Thermal Behavior of Metal Hydrogen Battery Cells.
Final Report,
A. Laursen, U. Fabricius, P. Stangerup, and S. Skelboe. Apr 79, 128p ESA-CR(P)-1271
Contract ESTEC-3346/77-NL-HP(SC)

A thermal equivalent model of a NiB2 and an AgH2 battery cell was defined to enable the thermal operation of the cell to be simulated using a computer. The various parts of the cells in terms of thermal parameters, i.e., thermal capacity and conductivity were determined. In parallel with the theoretical calculations of these parameters, measurements were carried out to verify or support the calculation. The heat flow generation profile were measured in an isothermal calorimeter under various cycling routines of the cells. Simulation of cell operation were carried out on a computer, and internal temperatures of the cell were calculated.

PATENT-4 164 069
Not available NTIS
Department of Energy, Washington, DC.
Method of Preparing a Positive Electrode for an Electrochemical Cell.
Patent,
Z. Tomczuk. Filed 28 Apr 78, patented 14 Aug 79, 6p PAT-APPL-901 046
Supersedes PAT-APPL-901 046-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method of preparing an electrochemical cell including a metal sulfide as the positive electrode reactant and lithium alloy as the negative electrochemical reactant with an alkali metal molten salt electrolyte is disclosed that permits the assembly to be accomplished in air. The electrode reactants are introduced in the most part as a sulfide of lithium and the positive electrode metal in a single-phase compound. For instance, Li sub 2 FeS sub 2 is a single-phase compound that is produced by the reaction of Li sub 2 S and FeS. This compound is an intermediate in the positive electrode cycle from FeS sub 2 to Fe and Li sub 2 S. Its use minimizes volumetric changes from the assembled to the charged and discharged conditions of the electrode and minimizes electrode material interaction with air and moisture during assembly. (ERA citation 05:020703)

PATENT-4 172 926
Not available NTIS
Department of Energy, Washington, DC.
Electrochemical Cell and Method of Assembly.
Patent,
H. Shimotake, E. C. H. Voss, and L. G. Bartholme. Filed 29 Jun 78, patented 30 Oct 79, 8p PAT-APPL-920 414
Supersedes PAT-APPL-920 414-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method of preparing an electrochemical cell is disclosed which permits the assembly to be accomplished in air. The cell includes a metal sulfide as the positive electrode reactant, lithium alloy as the negative electrode reactant, and an alkali metal; molten salt electrolyte. Positive electrode reactant is introduced as Li sub 2 -FeS sub 2 , a single-phase compound produced by the reaction of Li sub 2 S and FeS. The use of this compound permits introduction of lithium in an oxidized form. Additional lithium can be introduced in the negative electrode structure enclosed within an aluminum foil envelope between layers of porous aluminum. Molten salt electrolyte is added after assembly and evacuation of the cell by including an interelectrode separator that has been prewet with an organic solution of KCl. (ERA citation 05:020688)

SAN-1262-1 PC **A04**/MF **A01**
Lockheed Palo Alto Research Labs., CA.
Lithium-Water-Air Battery Automotive Propulsion. Final Report, October 28, 1976-September 28, 1977.
H. F. Bauman, and G. B. Adams. Oct 77, 60p
Contract EY-76-C-03-1262

Cell and battery tests were made to evaluate the technology involved in the operation of a Li-H sub 2 O-air battery. Power densities of 44 mW/cm exp 2 (2.2 V, 200 mA/cm exp 2) were obtained in cells with cathodes catalyzed with platinum black. A power density of 360 mW/cm exp 2 (2.0 V, 180 mA/cm exp 2) was achieved in cells with cathodes containing 2 mg/cm exp 2 of platinum on carbon. Lithium utilization efficiencies in excess of 80 percent were realized when electrolyte composition was controlled. Parameters affecting cell operation include electrolyte flow rate, air flow rate, pressure differential across the cathode, concentration of LiOH in the electrolyte, and (outside of certain limits) electrode contact pressure. A paper study was made of two-step methods of lithium reprocessing. A preliminary cost estimate of 65 cents per pound was made for reprocessed lithium produced from a 50,000 tons per year plant by using low-temperature electrolytic cells. Although problems were encountered in the operation of multicell batteries related to the balancing of electrolyte flow and the pressure differential across the cathodes in individual cells, these do not appear insurmountable. The concept of using Li-H sub 2 O-air battery for automotive propulsion appears viable, and additional effort should emphasize the design and operation of a larger size battery with automatic control of electrolyte dilution and power optimization. A more detailed examination of lithium reprocessing should be made for establishing the overall economics of using the system for automotive propulsion. 30 figures, 6 tables. (ERA citation 05:015851)

UCRL-83881 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Weight and Volume Estimates for Aluminum-Air Batteries Designed for Electric Vehicle Applications.
J. F. Cooper. Jan 80, 19p CONF-790759-3
Contract W-7405-ENG-48
International workshop on reactive metal-air batteries, Bonn, F.R. Germany, 9 Jul 1979.

The weights and volumes of reactants, electrolyte, and hardware components are estimated for an aluminum-air battery designed for a 40-kW (peak), 70-kWh aluminum-air battery. Generalized equations are derived which express battery power and energy content as functions of total anode area, aluminum-anode weight, and discharge current density. Equations are also presented which express total battery weight and volume as linear combinations of the variables, anode area and anode weight. The sizing and placement of battery components within the engine compartment of typical five-passenger vehicles is briefly discussed. (ERA citation 05:013636)

11. MATERIALS

11A. Adhesives and Seals

BDX-613-2414 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Failure Analysis of Ceramic-to-Metal Seals.
W. G. Gates. Mar 80, 25p
Contract EY-76-C-04-0613

Ceramic-to-metal seal failures that occur at the next assembly level present a critical problem because of the time and expense involved in the assembly of electro-mechanical switches. A typical analysis of a failed assembly and a recommended rework process is presented. In addition, steps are proposed to minimize the occurrence of future ceramic-to-metal seal failures. (ERA citation 05:016330)

PNL-SA-7640 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Sterilizing Radiation Effects on Selected Polymers.
W. E. Skiens. Mar 79, 18p CONF-7903108-1
Contract EY-76-C-06-1830
Symposium on radiation sterilization of plastic medical products, Cambridge, MA, USA, 28 Mar 1979.

The mechanism of radiation effects and their industrial applications are discussed for the following classes of polymers: thermoplastics, thermosets, elastomers, films and fibers, and adhesives/coatings/potting compounds. 35 references, 3 tables. (ERA citation 05:013995)

11B. Ceramics, Refractories, and Glasses

FRNC-TH-820 PC **A10**/MF **A01**
Lyon-1 Univ. (France).
Study by Internal Friction of Curing Low Temperature Irradiation Defects in Graphite.
D. Rouby. 1974, 224p
In French.Thesis.
U.S. Sales Only.

Micromechanical properties and anelastic effects of neutrons irradiated graphites at 300 and 77 exp 0 K are investigated by internal friction analysis and elasticity modulus variations. Defects created by irradiation are studied and evolution versus dose and annealing is followed. (Atomindex citation 10:490744)

LBL-10372 PC **A10**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Sintering Behavior of Mullite-Containing Materials.
M. D. Sacks. Dec 79, 223p
Contract W-7405-ENG-48
Thesis.

A sub 2 O sub 3 and SiO sub 3 were processed by powder and gel processes to form mullite-containing materials for sintering studies. The effects of phase composition, particle packing arrangement in the green compact, powder surface area, and sintering atmosphere on microstructural evolution and sintering kinetics (densification was observed when large amounts of liquid phase were present during sintering. In powder materials with composition near or within the mullite solid solution range, a proportionality was observed between the theoretical density and the logarithm of time for the various sintering temperatures. In gel materials, enhanced densification rates with increasing grinding times is observed. In sintering atmospheres, the total pressure and the partial pressure of oxygen were the important variables. (ERA citation 05:016185)

N80-21491/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
High Pressure Sintering of Non-Oxide Materials.
M. Shimado, N. Ogawa, and M. Koizumi. Nov 79, 7p NASA-TM-75744
Contract NASW-3198
Transl. into English from J. Jap. Soc. Powder Met., V. 25, No. 8 (Japan), Dec. 1978 p 275-276.

Pure materials of AlN, alpha-Si3N4 and TiC, without additives were sintered at 800 C to 1400 C under the pressures of 30 kbar and 50 kbar for 0.5 hours. The maximum density of sintered bodies for the cited materials was nearly 100% for AlN, 98% for TiC and 96% for alpha-Si3N4.

N80-21532/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Effects of Oxide Additions and Temperature on Sinterability of Milled Silicon Nitride.
A. Arias. Apr 80, 21p NASA-TP-1644, E-243

Specimens of milled alpha-Si3N4 with 0 to 5.07 equivalent percent of oxide additions were pressureless sintered at 1650 to 1820 C for 4 hours in nitrogen while covered with powdered Si3N4 + SiO2. Densities of less than or equal to 97.5 percent resulted with approximately 2.5 equivalent percent of MgO, CeO2, Y2O3, and three mixtures involving these oxides. Densities of greater than or equal to 94 percent were obtained with approximately 0.62 equivalent percent of the same additives. At most temperatures, best sinterability (density maxima) was obtained with 1.2 to 2.5 equivalent percent additive.

ORNL/TM-6840 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.

Effects of Alternate Fuels Refractory Test Facility (RTF) Test 2: Evaluation of Magnesia-Based Bricks and Mortar and Alumina-Based Bricks, Castables, and Fibrous Insulations Exposed to Residual Oil Combustion Products.
J. I. Federer, and V. J. Tennery. Mar 80, 125p
Contract W-7405-ENG-26

The effects on various refractories of the combustion products of No. 6 residual oil containing a high concentration of vanadium was determined. Other major oil impurities were Na, Ni, P, Si, and S. The specimens included magnesia-based bricks and mortar, alumina-based bricks and castables, and alumina-based fibrous insulations. The test was conducted in the Refractory Test Facility at 1375 exp 0 C for 510 h with 5.7 to 7.5% excess oxygen. After the test the specimens were analyzed to determine the extent of reaction with fuel impurities. None of the refractories were seriously degraded by reaction with fuel impurities. The least volatile fuel impurities (as oxides) were found most frequently in the specimens. Thus, nickel- and vanadium-bearing compounds were found in most specimens. Most of the dense refractories cracked during the test, but the magnesia-bricks and mortar cracked most extensively. The magnesia-based brecks and mortar darkened, but there was no evidence of degration, even on the hot face. (ERA citation 05:016190)

11C. Coating, Colorants, and Finishes

AD-A083 190/9 MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Salt Spray Testing of Metallic - Ceramic Coatings.
Phase rept.,
E. J. Jankowsky. 8 Feb 80, 22p Rept no. NADC-79257-60
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Fifteen metallic-ceramic coatings consisting of aluminum or aluminum-magnesium pigment suspended in an inorganic binder were applied to steel panels and tested for corrosion resistance in SO2-salt fog and 5% salt fog, respectively. Four coatings offered better protection than the MIL-c-81751 coating (Sermetel W). The best coating was Sermetel 762. Sermetel 763, Sermetel 725, and a dual coating of Sermetel W, Class 4 over Class 2, followed in order of decreasing protection. (Author)

AD-A083 202/2 PC **A03**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB OH
Thin Anodic Oxide Films on Aluminum Alloys and Their Role in the Durability of Adhesive Bonds.
Final rept. Jan-Aug 79,
Neil T. McDevitt, and James S. Solomon. Feb 80, 29p Rept no. AFML-TR-79-4216

The structure and chemical composition of anodic oxide films on aluminum alloys is discussed with reference to pure aluminum. The potential effects of these inhomogeneities are also discussed with reference to the durability of adhesively bonded structures. (Author)

AD-A083 368/1 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Metallic and Nonmetallic Inorganic Coatings. General Requirements for the Selection of Coatings.
2 Jul 79, 22p Rept no. FTD-ID(RS)T-0871-79
Edited trans. of Russian State Standard GOST 14623-69 p1-8, by Carol S. Nack.

No abstract available.

AD-A083 369/9 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Electrical Insulating Impregnating Varnishes BT-980, BT-987 and BT-988.
11 Jul 79, 9p Rept no. FTD-ID(RS)T-0921-79
Edited trans. of Russian State Standard GOST 6244-70 p1-4, by Robert D. Hill. Supersedes GOST 6244-52.

No abstract available.

AD-A083 373/1 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Oil and Alkyd Paints Ready for Use.
13 Jul 79, 17p Rept no. FTD-ID(RS)T-1040-79
Edited trans. of Russian State Standard GOST 10503-71 p1-12, by Robert D. Hill.

No abstract available.

AD-A083 578/5 PC **A05**/MF **A01**
Vought Corp Dallas TX
Investigation of Application Parameters and Testing of Rain Erosion Coatings.
Final technical rept.,
G. W. Kelly. 13 Mar 80, 93p Rept no. 2-30400/OR-52380
Contract N00019-78-C-0125

This program was sponsored in order that the performance of selected rain erosion coatings might be evaluated and that those parameters affecting the performance of these materials might be studied with the goal in mind to upgrade rain erosion coatings for use on high performance aircraft. In order to realize this goal, the following characteristics of two select polyurethane materials were evaluated: coating adhesion to the reinforced composite substrates; solvent evaporation rates or 'solvent release' from each select rain erosion coating material for the purpose of reducing coating porosity of the cured material; a polymerization study related to the chemical reactivity of these moisture reactive materials after exposure to known quantities of free water; a coating familiarization study for each of the rain erosion coating materials; radar signal attenuation studies to determine signal losses through the rain erosion coating; and high-speed erosion tests for selected coating materials and primer combinations. (Author)

11D. Composite Materials

AD-A083 173/5 PC **A05**/MF **A01**
Stanford Univ CA Div of Applied Mechanics
Elasticity Theory of Composites.
Interim rept.,
J. R. Willis. Mar 80, 83p Rept no. SUDAM-80-2
Contract N00014-76-C-0054

Variational methods for estimating overall properties of composites are reviewed. Bounds that allow for general two-point correlations are emphasized and new explicit formulae are given for a two-component composite. A new general third-order bound is also given. Finally a variational treatment of wave propagation problems for random composites is presented, of which the preceding static formulation is a limiting case. (Author)

AD-A083 532/2 PC **A05**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Strength of Nonmetallic Materials During Nonuniform Heating (Selected Chapters),
G. V. Isakhanov. 9 May 79, 91p Rept no. FTD-ID(RS)T-0225-79
Edited trans. of Prochnost' Nemetallicheskikh Materialov Pri Neravnomernom Nagreve, Izd-vo 'Naukova Dumka' (USSR) p1-26, p145-178 1971.

No abstract available.

AD-A083 570/2 PC **A04**/MF **A01**
University of Manchester Inst of Science and Technology (England) Dept of Metallurgy
Measurement of the Thermal Diffusivity of Carbon/Carbon Fibre Composites From 20-3000 C.
Interim rept. 30 Sep 77-30 Sep 79,
R. Taylor, and R. N. Procter. Nov 79, 73p
AFOSR-TR-80-0320
Grant AFOSR-77-3449

Thermal diffusivity measurements from 300-3000K have been made on the following materials using the laser pulse method: (a) 3-D carbon fiber carbon composites types 'A' and 'B' made using Fiber 'F' material; (b) 1-D carbon fiber composite; (c) the matrix material used in their fabrication. Thermal conductivity has been calculated from these results and a model of composite conductivity presented. (Author)

N80-21452/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Predicting the Time-Temperature Dependent Axial Failure of B/A1 Composites.
J. A. Dicarlo. 1980, 28p NASA-TM-81474, E-408
Presented at Symp. On Failure Modes in Composites, Las Vegas, Nev., 25-26 Feb. 1980, Sponsored by Metallurgical Soc. Of the AM. Inst. Of Mining, Metallurgical and Petroleum Engr.

Experimental and theoretical studies were conducted in order to understand and predict the effects of time, temperature, and stress on the axial failure modes of boron fibers and B/A1 composites. Due to the anelastic nature of boron fiber deformation, it was possible to determine simple creep functions which can be employed to accurately describe creep and fracture stress of as-produced fibers. Analysis of damping and strength data for B/6061 A1 composites indicates that fiber creep effects of creep on fiber fracture are measurably reduced by the composite fabrication process. The creep function appropriate for fibers with B/Al composites was also determined. A fracture theory is presented for predicting the time-temperature dependence of the axial tensile strength for metal matrix composites in general and B/A1 composites in particular.

N80-21550/2 PC **A03**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
Fatigue of Fiber-Reinforced Plastics. A Literature Survey.
C. Lundemo. 23 Aug 79, 46p FFA-TN-AU-1499
Contract SWEDBESD-5061.012

A review of constant amplitude fatigue of fiber reinforced plastic laminates taken from recent literature is presented. An inventory of test methods and choice of failure criteria is made. It has been found that the method of testing, which does not coincide with that used for metals, is of major importance for composite materials. Excellent fatigue properties for fiber controlled tension loaded laminates are reported. However, composites loaded in both tension and compression do suffer fatigue. It is, important to distinguish between different types of composites concerning type of fibers, matrix and different layup angles. Fatigue test data should include observed stiffness change after a certain number of cycles, since the decrease in stiffness is a function of damage in the matrix and fiber/matrix interface. Suggestions for further fatigue testing, leading to better understanding of the fatigue life of wind turbine blades are included.

PB80-171317 PC **A07**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Effects of Moisture, Residual Thermal Curing Stresses and Mechanical Load on the Damage Development in Quasi-Isotropic Laminates.
Interim rept. no. 16,
Ronald D. Kriz, Wayne W. Stinchcomb, and Darrel R. Tenney. Feb 80, 134p VPI-E-80-5
Grant NGR-47-004-129

This investigation demonstrates how the maximum moisture absorbed (that is the wet condition) in (0/plus or minus 45/90)s and (0/90/plus or minus 45)s laminates fabricated from T300/5208 significantly alters the dry stress state and subsequent damage development along the laminate free edge.

11E. Fibers and Textiles

AD-A083 395/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Effect of CVD Tungsten and TaC Coatings on the Mechanical Behavior of SiC(C).
Technical rept.,
I. Ahmad, N. Hill, and W. Heffernan. Dec 79, 48p
ARLCB-TR-79035, AD-E440 058

Effects of the chemically-vapor-deposited tungsten and TaC coatings on the mechanical properties of silicon carbide (carbon core) filament have

been investigated. In the temperature range of interest, because of the possible chemical interaction of tungsten with carbon rich silicon carbide phase on its surface and the columnar grain structure of the coating the filament was found to be embrittled. However, by controlling the initial nucleation of tungsten by adjusting the temperature, the direction of flow of reactants and filament speed, the degradation effect of the coating can be minimized. TaC coating did not decrease the strength of the filament, because it did not react with the filament and had fine grain structure. Coatings of tungsten and TaC decreased the 100 hr 2000 deg. F, rupture strength of the filament from 1.9 GN/sq M (280 Ksi) to respectively 1.05 GN/sq M (150 Ksi) and 1.6 GN/sq M (240 Ksi). The tensile strength of the W coated filament was superior to that coated with TaC in the temperature range 1000-1500 deg. C. Thermal cycling (room temperature - 1600 deg. C) induced cracks in the TaC coating while W coating remained unaffected.

COO-4527-3 PC **A03**/MF **A01**
United Merchants Research Center, Langley, SC.
Application of Foams to the Processing of Fabrics. Interim Report, October 1, 1977-March 31, 1979.
M. W. Duke. Apr 79, 48p
Contract EC-77-C-02-4527

The primary objective of this project is to reduce the energy requirements for finishing fabrics by drastically reducing the water required to wet process the fabrics. Since less water is used, less energy is consumed in the evaporation of water. This is accomplished by replacing much of the water with air, making a foam and using it as the application medium. In the first six months of the project the practicality of foam fabric finishing on a commercial basis had been established. Limited yardage of fabrics equivalent in performance to conventionally wet finished fabrics were processed. In these mill trials, a range of foam fabric finishes including softeners, hand builders, durable press and shrink-resistant types were applied to cotton sheeting, corduroy and polyester/cellulosic blends, etc. In all cases, substantial energy savings were realized. Since the issuance of the first and second interim reports, commercial practice of foam fabric finishing continues to grow with cumulative total estimated as approaching 200,000,000 yards. A number of companies are currently using foam fabric finishing as a commercial production process. Additionally, the pilot range has been used to demonstrate foam fabric finishing to over twenty companies. The range has been used to demonstrate the foam acid dyeing of nylon carpets to several companies in this specialized area of textile processing. Active work still continues with these companies since the foam dyeing of carpets involves only about 1/5 the water used in the normal continuous dyeing of carpets. At the time of writing two carpet companies are actively working to evaluate foam dyeing on a mill scale. (ERA citation 05:012114)

N80-21454/7 PC **A05**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Evaluation of Micron Size Carbon Fibers Released from Burning Graphite Composites.
B. Sussholz. Apr 80, 82p NASA-CR-159217, TRW-80-06
Contract NAS1-15465

Quantitative estimates were developed of micron carbon fibers released during the burning of graphite composites. Evidence was found of fibrillated particles which were the predominant source of the micron fiber data obtained from large pool fire tests. The fibrillation phenomena were attributed to fiber oxidation effects caused by the fire environment. Analysis of propane burn test records indicated that wind sources can cause considerable carbon fiber oxidation. Criteria estimates were determined for the number of micron carbon fibers released during an aircraft accident. An extreme case analysis indicated that the upper limit of the micron carbon fiber concentration level was only about half the permissible asbestos ceiling concentration level.

PB80-173628 PC **A07**/MF **A01**
Georgia Inst. of Tech., Atlanta.
Advanced Technology Applications in Garment Processing.
Summary technical rept. (Final),
Louis H. Bangert, John L. Lundberg, John D. Muzzy, L. Howard Olson, and W. Denney Freeston, Jr. Aug 79, 143p NSF/RA-790294
Grant NSF-APR74-02326
See also PB-284 779.

Several specific technologies have been explored which may form part of the knowledge base necessary for the successful conversion of polymer chips and/or staple fiber directly into garments without spinning, weaving or knitting, cutting and sewing. It is shown that polybutene-1 and polypropylene are soluble in n-butane and carbon dioxide, and nylon-6 dissolves in carbon dioxide. Light weight polypropylene, polybutylene and PBT fibrous webs were formed by melt foam fibrillation. Polypropylene foam fibrillated webs were converted into medium strength yarn. Natural and staple fiber was oriented in low velocity air streams using counter-flow jets and deposited on a screen without loss of orientation.

PB80-175235 PC **A04**/MF **A01**
Office of Science and Technology Policy, Washington, DC.
Carbon/Graphite Composite Material Study. Annual Report (2nd), 1979.
15 Mar 80, 67p
See also Annual rept. no. 1, PB80-120652.

Carbon/Graphite composite is an annual report of progress, problems, and budget recommendations submitted to the Office of Science and Technology Policy on December 31 of each year. This is the second such annual report.

11F. Metallurgy and Metallography

AD-A083 050/5 Not available NTIS
Manitoba Univ Winnipeg Dept of Physics
Time Effects in Co5Ce Powders,
G. Roy, and P. Gaunt. 1973, 7p DRB-4032
Availability: Pub. in AIP Conference Proceedings Number 18, Magnetism and Magnetic Materials-1973, p1202-1206 1973 (No copies furnished by DTIC).

No abstract available.

AD-A083 073/7 PC **A03**/MF **A01**
Army Missile Command Redstone Arsenal AL Ground Equipment and Missile Structures Directorate
Stress Intensities around Transverse Surface Flaws in Cylindrical Shells by Photoelastic Stress Freezing.
Technical rept.,
John A. Schaeffel, Jr. 1 Oct 79, 48p Rept no. DRSMI/RL-80-1

This report documents a set of seven tests for the determination of K sub I stress intensity factors for isotropic cylinders with transverse part-circular cracks loaded in combined uniaxial extension and internal pressure. Part-circular cracks were machined into birefringent Hysol CP5-4290 photoelastic cylinders. The cylinders were then subjected to combined loading while in a stress freezing cycle. Slices of the cracks were made at various angles and analyzed with a photoelastic polariscope. A least-squares curve fit of the photoelastic data was used to generate K sub I stress intensity factors. K sub I data are plotted versus slice angle into the crack for various crack parameters. The results of the tests were compared with the results of previous tests in which the cylinders were loaded in either pure uniaxial tension or internal pressure. (Author)

AD-A083 133/9 MF **A01**
SKF Technology Services King of Prussia PA
Establishment of the Material Factor for VIMVAR M-50 Tool Steel for Use in Rolling Bearing Life Calculations.
Final rept. 27 Dec 78-31 Aug 79,
Frank R. Morrison, John I. McCool, and Nicholas J. Ninos. 24 Aug 79, 89p Rept no. SKF-AL79T027
Contract DAAK50-78-C-0027
See also Rept. no. USAAVRADCOM-TR-79-35 dated 1 Apr 79, AD-A074 217.
Availability: Microfiche copies only.

Material and lubrication factors for M-50 steel rolling contact bearings have been determined via a survey accumulating life results from previously conducted test programs. Experimental life results are presented on five groups of angular contact ball bearings manufactured from VIMVAR M-50 steel and run under several load speed and lubrication conditions. (Author)

AD-A083 155/2 PC **A03**/MF **A01**
Sussex Univ Brighton (England) School of Engineering and Applied Sciences
Metallic Glasses, (Review of Physical Characteristics),
R. W. Cahn. 1980, 35p Rept no. TR-6
Grant N00014-78-G-0048
Pub. in Contemporary Physics, v21 n1 p43-75 1980.

No abstract available.

AD-A083 167/7 PC **A05**/MF **A01**
United States Steel Corp Monroeville PA Research Lab
Effect of Controlled Rolling on the Crystallographic Texture and the Mechanical and Ballistic Properties of Steel Armor Plates.
Final rept. 8 Jan 79-7 Jan 80,
Hsun Hu. Mar 80, 80p AMMRC-TR-80-4
Contract DAAG46-79-C-0010

The scope of the present research included two parts: (1) to further strengthen the (112)+(111) texture in the 5Ni steel (actually a medium-carbon 5Ni-Si-Cu-Mo-V steel) armor by introducing modifications to the previously employed hot-rolling process, and to provide latitude in production of this superior textured armor plate; (2) to investigate the crystallographic texture formation in an austenitic steel system (such as the A-286 alloy) so that textures other than those formed in quenched-and-tempered martensite can be produced and their effects on properties can be studied.

AD-A083 245/1 PC **A03**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Three Dimensional Finite-Element Elastic Analysis of a Thermally Cycled Double-Edge Wedge Geometry Specimen.
Final rept. 1 Jun 77-1 Jan 79,
Sandra K. Drake, Richard J. Hill, Peter T. Bizon, Jeffrey L. Kladden, and Bruce P. Guilliams. Mar 80, 49p Rept no. AFWAL-TR-80-2013

An elastic stress analysis was performed on a wedge specimen (prismatic bar with double-edge wedge cross-section) subjected to thermal cycles in fluidized beds. Five alloys (IN 100, Mar-M 200, Mar-M 302, NASA TAZ-8A, and Rene 80) subjected to the same thermal cycling condition were analyzed. This condition was alternate 3 minute immersions in fluidized beds maintained at 316 degrees and 1088 degrees C (600 degrees and 1990 degrees F). The analyses were performed as a joint effort of two laboratories using different models and computer programs (NASTRAN and IS03DQ). Stress, strain, and temperature results are presented. (Author)

AD-A083 394/7 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Case Studies of Fatigue Crack Growth Using an Improved Micro-Ligament Instability Model.
Memorandum rept.,
J. M. Krafft. 30 Jan 80, 71p NRL-MR-4161, AD-E000 392

The tensile ligament instability model TLIM has been refined and modified. A large set of new data cases is analyzed using the improved algorithm, most of these with high fidelity. In microstructurally varied titanium alloys, the process zone size is associated with the effective grain size; in structural and alloy steels it decreases with increasing yield strength, presumably here too related to grain refinement. The other fitting parameters, of environmental surface attack, show an internal consistency among the various specimen materials and environments. The modified model is thought to provide an advantageous means of comparing crack propagation data, and, in selected classes of ma-

terials, a suitable basis for predicting fatigue propagation life.

AD-A083 413/5 Not available NTIS
Materials Research Labs Ascot Vale (Australia)
Pitting of Plain Carbon Steels in Acidic Solution,
Veronica M. Silva, and Lindsay F. G. Williams. 14 Mar 77, 7p
Availability: Pub. in Surface Technology, v6 p131-137 1977 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 415/0 Not available NTIS
Materials Research Labs Ascot Vale (Australia)
The Influence of Hydrostatic Pressure on the Fracture Mechanisms of Sheet Tensile Specimens of Copper and Brass,
P. F. Weinrich, and I. E. French. 8 Aug 75, 6p
Abstract in French and German.
Availability: Pub. in Acta Metallurgica, v24 p317-322 1976 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 416/8 Not available NTIS
Materials Research Labs Ascot Vale (Australia)
A Compact C-Shape Specimen for Fracture Toughness Testing,
J. C. Ritter, and T. W. Rea. 27 Jun 76, 5p
Availability: Pub. in Engineering Fracture Mechanics, v9 p541-546 1977 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 418/4 Not available NTIS
Materials Research Labs Ascot Vale (Australia)
A Modified Thickness Criterion for Fracture Toughness Testing,
J. C. Ritter. 15 Jul 76, 12p
Availability: Pub. in Engineering Fracture Mechanics, v9 p529-540 1977 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 460/6 Not available NTIS
Materials Research Labs Ascot Vale (Australia)
The Effect of Microstructure on the Strength and Toughness of Mild Steel,
M. E. de Morton. 13 Jul 77, 14p
Availability: Pub. in Jnl. of the Australasian Inst. of Metals, v22 n2 p86-99 Jun 77 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 496/0 PC **A02**/MF **A01**
Pratt and Whitney Aircraft Group West Palm Beach FL Government Products Div
Application of Rapidly Solidified Alloys.
Quarterly rept. 1 Feb-1 May 79,
C. M. Adam, R. G. Bourdeau, J. W. Broch, and A. R. Cox. Jun 79, 25p Rept no. PWA-FR-12127
Contract F33615-76-C-5136

This program is being conducted for the purpose of applying the principle of rapid solidification to aluminum and iron alloy powder and subsequent development of stronger alloy compositions for fan blade application (Al alloys) and higher speed bearing materials (Fe alloys). Centrifugal atomization and forced convective cooling are being used to produce the fast cooled powder. During this report period, adaptation of the RSR process to aluminum and iron systems was continued. The evaluation of the first aluminum alloy matrix was partially completed, and a second matrix was selected. Hardness testing and microstructural evaluation of Fe alloys was performed. (Author)

AD-A083 534/8 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
An Investigation of Over-Heating and Rock-Like Fracture of Steel 18Cr2Ni4WA,
Yeh Li. 29 Jun 79, 19p Rept no. FTD-ID(RS)T-0257-79
Edited trans. of Acta Metallurgica Sinica (China) v13 n3 p187-192 Sep 77.

No abstract available.

AD-A083 574/4 PC **A05**/MF **A01**
SRI International Menlo Park CA
Further Development of a Computational Shear Band Model.
Final rept. May 77-Sep 78,
D. C. Erlich, D. R. Curran, and L. Seaman. Mar 80, 87p AMMRC-TR-80-3
Contract DAAG46-77-C-0043

Experimental and analytical work was performed to improve the computational model for adiabatic shear band nucleation and growth (SNAG). A series of contained fragmenting cylinder experiments were performed with 4340 steel treated to hardness of R sub c 40, R sub c 52, and R sub c 21. The resulting damage ranged from homogeneous plastic deformation to extensive shear banding and resulting fragmentation. The results showed strong positive correlation between shear banding damage and material hardness for identical loading conditions. A simplified method of damage quantification was used to obtain shear band density, size and orientation distributions for all of the R sub c 40 experiments. Preliminary computer simulations were performed to determine plastic shear strain rate histories in the direction of the predominant shear banding orientation mode, and the computations were compared with experimental data to yield first estimates for the values of the nucleation and growth parameters. A shear band nucleation criterion based on measurable material properties was proposed and tested against the experimental data; the criterion was seen to be promising although not yet conclusive. Several experimental techniques for characterizing the shear banding resistance of materials were evaluated and compared. The contained fragmenting cylinder experiment was concluded to be the best single technique, although the dynamic punch test has special value for armor penetration applications.

AD-A083 579/3 PC **A03**/MF **A01**
Solar Turbines International San Diego CA
Study of Surface Reaction of Impacted Chlorides on Marine Gas Turbine Hot Corrosion at Low Power Conditions.
Final rept. 11 May 78-11 May 79,
E. R. Duffy, and A. R. Stetson. Sep 79, 33p Rept no. SR79-R-4704-11
Contract N00173-78-C-0439

Because of the importance of Na2SO4 and its reaction with the substrate in hot corrosion attack on superalloys, the amount of this compound formed from NaCl and sulfur oxides is extremely important in determining hot corrosion potential. The objective of this program was to determine the influence of surfaces on the kinetics of the conversion of NaCl and MgCl2 to Na2SO4 and MgSO4, respectively, in a typical combustion environment. (Author)

AD-A083 618/9 Not available NTIS
Nondestructive Testing Information Analysis Center San Antonio TX
NDE Applications of Magnetic Leakage Field Methods. A State-of-the-Art Survey,
R. E. Beissner, G. A. Matzkanin, and C. M. Teller. Jan 80, 55p Rept no. NTIAC-80-1
Contract DLA900-79-C-1266
Available from Nondestructive Testing Information Analysis Center, San Antonio, TX 78284. PC$35.00 (No copies furnished by DTIC).

Magnetic methods of nondestructive evaluation (NDE) are among the oldest and most pervasive in the industrialized countries of the world because of the dominant production and use of steel and related ferrous metals. Economically, it is difficult to imagine a more important industrial commodity than steel. Without doubt more steel tonnage is produced per year than any other metal. There is a growing interest, too, in the quality and reliability of parts fabricated from high-strength alloy steels for critical aerospace as well as energy production applications. As replacement costs continue to soar, it is vital to get the maximum safe life from structures and components as divers as jet engine bearings and gas pipelines.

AED-Conf-77-535-002 PC **A02**/MF **A01**
Norddeutsche Affinerie, Hamburg (Germany, F.R.).
Demands Made on High-Purity Copper for Special Purposes.
D. Roettges. 1977, 14p CONF-7711105-2
In German.Symposium on impurities in metals, Bad Nauheim, F.R. Germany, 3 Nov 1977.
U.S. Sales Only.

The properties (electrical resistivity, residual impurities) of high-purity copper produced on a technical scale are reported as well as its practical applications. The paper discusses a high-oxygen copper (SV) with low residual resistivity at low temperatures and an oxygen-free (hydrogen-stable) copper (BE electronic) with low gas content. The SV quality has been specially developed for use as stabilizer in superconductors while the BE quality is used in high and ultrahigh vacuum. (Atomindex citation 10:425901)

CEA-CONF-4078 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Contribution to the Study of Ionic Emission in Ni-Cu, Ni-Fe, Al-Cu and AlFe Alloys. Influence of the Oxygen Chemical Affinity of the Constituents.
Y. Limoge, F. Maurice, and J. L. Seran. 10 Aug 77, 15p CONF-770849-6
In French.Microprobe analytical society meeting, Boston, MA, USA, 16 Aug 1977.
U.S. Sales Only.

The behavior of alloys according to the oxygen affinity of their constituents enables to study the possibilities of quantitative chemical analysis for two opposite binary systems. When the oxygen affinity of the constituents of a binary system is very similar, the ionic constant is invarying in the whole concentration range and the analysis of a calibration alloy of the binary system is sufficient for determining its value. When the oxygen affinity of the constituents of a binary system is very different, the ionic constant varies in the whole concentration range. A model of chemical emission is developed considering that the impurity very avid of O sub 2 forms a complex. In these conditions, the matrix atoms react differently according as they are near or far from the impurity. The emission probability is higher for an atom in the neighboring of the impurity than for an isolated atom. (Atomindex citation 09:413689)

CONF-791142-6 PC **A02**/MF **A01**
Argonne National Lab., IL.
Actinide 5F Systems: Experimental Determination of the Magnetic Response Function.
G. H. Lander. 1979, 14p
Contract W-31-109-ENG-38
International Conference on crystal field and structural effects in f-electron systems, Philadelphia, PA, USA, 12 Nov 1979.

Understanding of metallic actinide systems is in confusion. Searches for crystal-field levels with neutron spectroscopy have, for the most part, been unsuccessful, despite the acknowledged importance of the 5f electrons in determining the magnetic behavior. In systems such as UAl sub 2 , USn sub 3 and UN a broad response function, S(Q vector, omega), reminiscent of that found in intermediate valent compounds, exists. Neutron inelastic scattering experiments on single crystals have shown the small influence of the crystal field. Instead we find an unusual response function dominated by the longitudinal susceptibility chi/sup zz/ (Q vector,, omega) such that transverse excitations - conventional spin waves - do not exist at low energies. As yet a detailed theoretical interpretation of the measurements does not exist. Indeed, the small, although not necessarily negligible, role of the crystal field presents conceptual difficulties if we anticipate behavior analogous to that found in many lanthanide 4f systems. Some alternate approaches are discussed. (ERA citation 05:016162)

DOE/TIC-11127 PC **A02**/MF **A01**
Argonne National Lab., IL.
Ultrasonic Testing for Detection of IGSCC.
D. S. Kupperman. 1980, 24p
Contract W-31-109-ENG-38

Beginning in the fall of 1974, numerous intergranular stress-corrosion cracks (IGSCC) have been found in the heat-affected zone (HAZ) of welded Type 304 stainless steel reactor piping. As a result of these findings, a 2-year program sponsored by EPRI was initiated at Argonne National Laboratory (ANL) in 1975 to help establish the adequacy of

conventional ultrasonic-testing techniques for the detection of IGSCC. This paper discusses the quantitative data describing the effect of transducer parameter variations on ultrasonic echo amplitude from a variety of artificial and natural reflectors and gives suggestions for improvements in ultrasonic in-service testing methods, including the use of focussed probes. The effect of variation in ultrasonic attenuation between HAZ and base metal, the importance of adequate reference standards, and geometric effects are also discussed, and recent efforts at ANL and other institutions to improve ultrasonic detection of cracks are reviewed. (ERA citation 05:016144)

DP-MS-79-64 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Low-Temperature Helium Embrittlement of Tritium-Charged Stainless Steel.
D. E. Rawl, Jr., G. R. Caskey, Jr., and J. A. Donovan. 1980, 25p CONF-800205-4
Contract EY-76-C-09-0001
American Institute of Metallurgical Engineers meeting, Las Vegas, NV, USA, Feb 1980.

Specimens of Type 21-6-0 stainless steel were charged with tritium or protium to determine the effect of hydrogen isotope exposure on ductility. Specimens charged with either tritium or protium showed a 40% loss in ductility when tested immediately after charging. Protium-charged specimens stored 5.5 years at 250 exp 0 K showed no additional loss in ductility. However, tritium-charged specimens suffered an additional loss of 86% in ductility when similarly stored. (ERA citation 05:016146)

FE-3050-T3 PC **A03**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Study to Optimize Cr-Mo Steels to Resist Hydrogen and Temper Embrittlement. First Annual Report, End of Fourth Quarter. Research Report 79-9D9-HYTEM-R3.
B. J. Shaw, and E. W. Johnson. 17 Dec 79, 40p
Contract EY-78-C-01-3050

The first annual report on the DOE contract on temper embrittlement and hydrogen embrittlement characteristics of 2-1/4 Cr-1 Mo steels gives a review of the status of the program and an outline of the most significant tests performed in H sub 2 S to date. A description of the new testing procedure developed on this program to evaluate the hydrogen embrittlement susceptibility is presented along with the estimates of the crack arrest stress intensities measured on re-tempered commercial steels. (ERA citation 05:016173)

GA-A-15564 PC **A04**/MF **A01**
General Atomic Co., San Diego, CA.
Influence of a Simulated HTGR Environment on the Mechanical Properties of a Commercial Ni-Cr-Mo-Fe Alloy (Hastelloy Alloy X).
C. C. Li, W. R. Johnson, and L. D. Thompson. Dec 79, 61p
Contract AT03-76ET35300

The influence of a simulated advanced-reactor helium environment, containing 500 mu atm H sub 2 /50 mu atm CH sub 4 /50 mu atm CO/approx. 1 mu atm H sub 2 O, on the mechanical properties of two heats of Hastelloy Alloy X is discussed. Simultaneous exposures in air and controlled-impurity helium at temperatures in the range of 650 exp 0 to 1000 exp 0 C for times of 3000 h or more were performed. A combination of tensile testing, Charpy V-notch impact toughness testing, and creep testing was used to study the effects of reactor helium/metal interactions on the mechanical behavior of this alloy. Carburization was identified as the primary corrosion phenomenon. Increasing exposure time and temperature were observed to increase the depth of carburization. The increase in carbon concentration in the carburized zone suppressed the additional formation of M sub 6 C, which is observed in air-aged specimens, and resulted in the precipitation of M sub 23 C sub 6 , a chromium-rich carbide variant. The precipitation of M sub 23 C sub 6 in the carburized zone occurred primarily along grain and twin boundaries; however, matrix precipitation was also observed, the degree of which depended on exposure temperature. Strength and impact toughness properties were found to be controlled primarily by thermal aging reactions, with only a small effect related to the carburization. Although tensile and creep ductilities were decreased as a result of carburization, substantial ductility remained. Variation was observed between the two heats, the finer-grained heat appearing to be weaker in the high-temperature creep tests and also possibly more susceptible to a loss of creep strength as a result of carburization. (ERA citation 05:013898)

IAE-3040 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Theory of Blister Formation.
Yu. V. Martynenko. 1978, 16p
In Russian.
U.S. Sales Only.

The formation of blister by irradiation with helium ions is theoretically investigated. Possible pressures in helium bubbles in metals, helium atom - to bubble and vacancy - to bubble binding energies are calculated. Bubble growth kinetics is considered. Based on kwown profiles of interstitial ions and defects, gas pressure in bubbles and stress in a layer as X layer depth function are calculated. Assuming that the crack is formed in bulk where the stress is maximum at the moment when it reaches ultimate strength expressions for the depth of crack formation and critical dose of formation of blisters are obtained, which agree well with the experiment. The amount of gas which can release into the crack the integral internal lateral stress in the irradiated layer and the conclusion is made on the possibility of blister buckling on account of the gass pressure inside the blister as well as on account of internal stress. The first mechanism prevails at high temperatures, the second one at lower temperatures. (Atomindex citation 10:489022)

IEA-DT-098 PC **A04**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Preferred Orientations in Niobium Determined by Neutrons Diffraction.
S. I. N. Ueno. Feb 79, 70p
In Portuguese.Thesis.
U.S. Sales Only.

Neutron diffraction has been utilized to study textures developed in polycrystalline niobium, cold rolled to 60%, 80% and 95% in tickness and cold rolled to 95% in thickness and annealed at 800 exp 0 C for 15, 30, 60 and 120 minutes in a vacuum of 10 exp -4 TORR. (Atomindex citation 10:476339)

INIS-mf-4821 PC **A06**/MF **A01**
Natal Univ., Pietermaritzburg (South Africa).
Macroscopic Morphology of Radiation Damage in Copper.
Thesis (M. Sc.),
K. E. Black. Jan 77, 114p
U.S. Sales Only.

This Thesis describes the damage produced in copper single crystals when they are irradiated with neutrons from a nuclear reactor, and shows that the morphology of the damage is dependent on the temperature of irradiation. The production of point defects in the initial stages of the bombardment and their subsequent diffusion is described in Chapter One. Chapter Two describes the techniques used to etch and thus make visible the damage regions. The defect clusters were examined with a microscope. A typical selection of micrographs of the damage is presented and discussed in Chapter Three. In the final chapter, Chapter Four, the results of the present work are discussed in the light of work done by other research workers. The Thesis ends with a brief suggestion for future work to be carried out on neutron irradiated copper single crystals. (Atomindex citation 10:442553)

INIS-mf-4830 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Thermal Migration of Iron Implanted in Aluminium at High Doses.
V. K. Asundi, M. C. Joshi, S. K. Deb, D. K. Soud, and V. N. Kulkarni. 1978, 11p CONF-780932-8
Conference on ion beam modification of materials, Budapest, Hungary, 4 Sep 1978.
U.S. Sales Only.

The anneal behaviour of the Fe-Al metastable system produced by implantation of Fe exp + ions at 30 keV has been reported. The implant concentrations between 18-42 at percent have been chosen, in order to exceed the normal solid solubility of Fe in Al by about three orders of magnitude. Isothermal annealing has been done under vacuum (55 x 10 exp -6 Torr) at 400deg C and 570 deg C. The iron depth profiles have been determined, by Rutherford backscattering of 2 MeV He exp + ions. It has been found that 1) as annealing proceeds, all specimens show rapid enhanced diffusion initially (upto about 30 m), followed by a much slower diffusion as iron ions migrate inwards (2) at implant concentrations 23 at percent, double peaks appear in iron depth profiles, followed by rapid migration of diffused iron towards surface and (3) at still higher anneal times, the out-diffused iron moves inward again. This kind of out-diffusion behaviour in a metallic system has not been reported earlier in the literature. Also, the presence of Fe sub 4 Al sub 13 has been identified as terminal phase, using x-ray diffraction techniques. (Atomindex citation 10:442524)

IS-T-893 PC **A09**/MF **A01**
Ames Lab., IA.
High Temperature Corrosion Studies. A. Iron: Based Superalloy in SO sub 2 /O sub 2 Atmospheres. B. Gas: Solid Reaction with Formation of Volatile Species.
T. K. Liu. Mar 80, 197p
Contract W-7405-ENG-82
Thesis.

The thermogravimetric method was used to study high temperature corrosion under SO sub 2 /O sub 2 atmosphere applied to Armco 18SR alloys with different heat treatment histories, Armco T310 and pure chromium between 750 and 1100 exp 0 C. The weight gain follows the parabolic rate law. The volatilization of the protective Cr sub 2 O sub 3 layer via formation of CrO sub 3 was taken into account above 900 exp 0 C for long time runs. The parabolic rate and the volatilization rate, derived from fitting the experimental data to the modified Tedmon's non-linear model, were correlated using the Arrhenius equation. Armco 18SR-C has the best corrosion resistance of the Armco 18SR alloys. Armco T310 is not protective at high temperatures. The available rate data on the oxidation of chromium oxide, chlorination of chromium, oxidation-chlorination of chromium oxide, chlorination of nickel and chlorination of iron were found to be predictable. The calculation of high temperature volatilization rate was performed using the available fluid correlation equations and the Lennard-Jones parameters derived from the molecule with similar structure and from the low temperature viscosity measurement. The lower predicted volatilization rate is due to the use of the Chapman-Enskog equation with the Lennard-Jones parameters mostly derived from the low temperature viscosity measurement. This was substantiated by comparing the reliable high temperature diffusion rate in the literature with the above mentioned calculational method. The experimental volatilization rates of this study are compared with the other related studies and the mass transfer predictions. (ERA citation 05:016174)

ISM-243 PC **A02**/MF **A01**
Missouri Univ.-Columbia.
Relationship of the Geometry of the Observed Steady State Chemical Conversion Rate to the Basic Surface Reaction Process in Electrochemistry.
D. G. Retzioff, B. DeFacio, J. E. Bauman, and P. H. Ragatz. 1979, 12p CONF-7908108-1
Contract W-7405-ENG-82
Conference on surface physics, LaJolla, CA, USA, 6 Aug 1979.

The steady state surface reaction rate for electrochemical reactions is frequently measured by the polarization curve. In the anodic region of this curve the dynamics of the reaction process are generally described by a semiflow map. The fixed points of this map describe the steady state dynamics of the surface reactions. These generic singularities are classified according to their bifurcation structure. For the corrosion of aluminium this steady state bifurcation structure is found ex-

perimentally to be given by a butterfly catastrophy surface. Each structure has a characteristic signature which can be experimentally observed. This is most readily seen in the polarizations curves obtained in the study of surface reactions in electrochemistry and corrosion. Each characteristic signature is described by two variables: the codimension (cod) and k-determinacy (sigma). These variables are obtained directly from the polarization curve and are determined by its geometric structure. The codimension and k-determinacy can be calculated from any detailed physical model of the surface reactions that occur. Thus the experimental results constrain the possible physical models that can be considered to describe the reaction process because the codimension and k-determinacy values must agree for both the experiment results and the physical model. Because cod and sigma are measures of the geometric shape of polarization curve what is being required is that any physical model be capable of representing the geometry of the experimental results.In the study of electrochemical corrosion reactions this analysis completely explains why the usual Tafel Law and its associated model of the surface reactions involved is entirely inadequate to describe the physics of the anodic region of the polarization curve. Results of this analysis as applied to electrochemical reaction studies of aluminum are described. (ERA citation 05:016175)

ISM-249 PC **A02/MF A01**
Ames Lab., IA.
Hydrogen Embrittlement in Vanadium Single Crystals.
S. Shei, and T. E. Scott. 1979, 4p CONF-791132-2
Contract W-7405-ENG-82
JIM international symposium on hydrogen in metals, Minakami Spa, Japan, 26 Nov 1979.

Mechanical properties of <149> oriented single crystals of high purity vanadium and hydrogen-charged vanadium were investigated in the temperature range from 77 to 296 exp 0 K. Cleavage fracture occurred in hydrogen-charged crystals tested at temperatures above and below the stress-free hydrogen solvus temperature. Fractographic studies showed small whiskers along edges of cleavage steps. The effect of hydrogen on fracture behaviors and strengthening of vanadium is discussed. (ERA citation 05:012185)

JINR-R-6-9916 PC **A02/MF A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Diffusion of Trace Amounts of Some Rare Earths, Ba,Sr,Cs and Rb in Hafnium.
G. Yu. Baier, and A. F. Novgorodov. 1976, 20p
In Russian.
U.S. Sales Only.

Diffusion of some uniformly distributed spallation products in hafnium irradiated with protons having an energy of 660 meV has been studied in the temperature range of 1700-2300 K. The values of the effective diffusion coefficients decrease in the following order: Sr > Ba > r.e.e. > Rb > Cs. It is shown that the phase transition in hafnium at 2033 K increases considerably the diffusion of rare-earth and alkaline-earth elements and does not affect the diffusion of alkaline elements. It is proposed to use heated metal hafnium as on-line target for producing short-lived radionuclides on installations operating on-line with a mass-separator. (Atomindex citation 09:413761)

KFK-2711 PC **A04/MF A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Technische Physik.
Correlations Between Reaction Conditions, Grain Structure and Pinning Behavior of Nb sub 3 Sn Multifilament Conductors.
Diploma thesis,
W. Schelb. Oct 78, 75p
In German.
U.S. Sales Only.

Commercial Nb sub 3 Sn multifilamentary wires have been investigated by TEM and REM methods to study the relation between volume pinning force Fsub(p) and average grain size d. To do this, 35 short samples have been reacted at different conditions (570 exp 0 C - 800 exp 0 C, 4 h - 200 h) in an inert gas atmosphere, critical current has been measured in transverse fields up to 13 Tesla and current density and volume pinning force have been calculated from the reacted area determined by electron microscope investigation. The average grain size was evaluated from TEM photogrphs and ranged from 30 nm to 210 nm. Before TEM could be applied, the samples had to be thinned first electrolytically and then by sputter etching. The correlation between the maximum volume pinning force Fsub(pmax) and the reciprocal grain diameter d exp -1 (= linear grain boundary density) follows a Fsub(pmax) proportional t d exp -2 / exp 3 law for 5 mu m exp -1 < d exp -1 < 30 mu m exp -1 (210 nm > d > 33 nm) within the experimental error. At d exp -1 approximately equal to 30 mu m exp -1 (d approxymately equal to 33 nm) a maximum seems to exist. (Atomindex citation 10:435065)

KFKI-1977-71 PC **A02/MF A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Evaluation of Complex Moessbauer Spectra in Amorphous and Crystalline Ferromagnets.
I. Vincze. Sep 77, 13p
U.S. Sales Only.

A very general method is proposed for an important simplification of the complex Moessbauer spectra often obtained in ferromagnets. With a linear combination of two spectra measured by different angles between the gamma-direction and the plane of polarization, two subspectra can be obtained containing separated sets of the given transition lines. In this way one can get rid of the problems connected with overlapping lines, thickness and texture effects. The evaluation of the hyperfine field distribution and the effects of the isomer and quadrupole shift distributions are discussed. Application is shown for an amorphous Fe sub 80 B sub 20 (METGLAS 2065) and for a crystalline disordered (Fe/sub 0.65/Co/sub 0.35/)B alloy. The latter differs from the former in the very sharp p(S) functions which correspond to discrete values of the isomer and quadrupole shifts. (Atomindex citation 10:436071)

KFKI-1978-12 PC **A02/MF A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Moessbauer Investigation of Ferromagnetic Metallic Glasses.
L. Takacs. Feb 78, 9p
U.S. Sales Only.

The electronic structure of the metallic glasses Fe-B, Fe-Co-B and Fe-Ni-B has been investigated using Moessbauer effect. A comparison with the properties of crystalline Fe-Co and Fe-Ni alloys and T sub 2 B and TB intermetallic compounds (T means 3d transition metals) shows that the electronic structure can be well described in terms of the donor model. The localization of the electronic states is basically determined by the metalloid concentration. An increase in the latter enhances the localization of the electronic states. The electronic structure is not too sensitive to the amorphousness of the structure because of the similar short-range order of metallic glasses and crystalline intermetallic compounds. (Atomindex citation 10:436042)

LBL-10007 PC **A02/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Research on the Monolithic Process of Making A-15 Superconducting Materials.
M. Hong, D. Dietderich, and J. W. Morris, Jr. Aug 79, 20p CONF-790815-33
Contract W-7405-ENG-48
Cryogenic engineering conference, Madison, WI, USA, 21 Aug 1979.

It is possible to produce high T/sub c/ wires or tapes from the V-Ga system by a monolithic process in which an ingot is cast as a supersaturated solution of V and Ga, homogenized at elevated temperature, quenched to preserve the supersaturation, formed into a wire or tape, and finally heat treated at a relatively low temperature to precipitate the superconducting phase. To achieve exceptionally high critical temperatures, the precipitation reaction must be carried out at temperatures below approximately 750 exp 0 C. The measured critical temperature then becomes a function of the aging time, and reaches a maximum value as high as 14.8 exp 0 K in alloys containing 17 to 19 at. % Ga. The reason for the exceptionally high critical temperature when the precipitation is carried out at lower aging temperatures is not established, but may be plausibly interpreted as due to a thermodynamic tendency for small precipitates formed from highly supersaturated solid solutions to be rich in solute content. (ERA citation 05:013890)

LBL-10110 PC **A02/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Effects of the Microstructure of Ductile Alloys on Solid Particle Erosion Behavior.
A. V. Levy, and S. Jahanmir. Oct 78, 15p CONF-781093-5
Contract W-7405-ENG-48
TMS/AIME fall meeting, St Louis, MO, USA, 15 Oct 1978.

The effect of microstructure of two phase alloys, consisting of a softer, ductile matrix and a harder interspersed phase, on erosion behavior was determined. The stress and strain distribution in a two phase alloy where the second, hard phase is a distribution of particles in a more ductile matrix was calculated. It was determined that a spheroidized 1075 carbon steel eroded 30 percent less than a pearlitic microstructure of the same steel even though the spherodized form was 21 R/sub B/ points of hardness lower than that of the pearlitic steel. The computerized calculation of stresses and strains from the impact of eroding particles on a two phase alloy surface were used to define the ability of the particle impact to induce voids and cracks in the target material that could cause material loss. The resultant predicted voids and cracks were related to experimentally determined behavior of spherodized steel. (ERA citation 05:012198)

N80-21488/5 PC **A02/MF A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Application of Superalloy Powder Metallurgy for Aircraft Engines.
R. L. Dreshfield, and R. V. Miner, Jr.. 1980, 21p NASA-TM-81486, E-395
Proposed for Presentation at Intern. Powder Met. Conf., Washington, D.C., 22-27 Jun. 1980.

In the last decade, Government/Industry programs have advanced powder metallurgy-near-net-shape technology to permit the use of hot isostatic pressed (HIP) turbine disks in the commercial aircraft fleet. These disks offer a 30% savings of input weight and an 8% savings in cost compared in cast-and-wrought disks. Similar savings were demonstrated for other rotating engine components. A compressor rotor fabricated from hot-die-forged-HIP superalloy billets revealed input weight savings of 54% and cost savings of 35% compared to cast-and-wrought parts. Engine components can be produced from compositions such as Rene 95 and Astroloy by conventional casting and forging, by forging of HIP powder billets, or by direct consolidation of powder by HIP. However, each process produces differences in microstructure or introduces different defects in the parts. As a result, their mechanical properties are not necessarily identical. Acceptance methods should be developed which recognize and account for the differences.

N80-21489/3 PC **A02/MF A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
An Investigation into the Role of Adhesion in the Erosion of Ductile Metals.
W. A. Brainard, and J. Salik. 1980, 20p NASA-TM-81458, E-028
Presented at the 35TH Ann. Meeting of the AM. Soc. Of Lubrication Engr., Anaheim, Calif., 5-8 May 1980.

Existing theories of erosion of ductile metals based on cutting and deformation mechanisms predict no material removal at normal incidence which is contradictory to experience. Thus, other mechanisms may be involved. The possible role of adhesive material transfer during erosion is investigated by both single particle impingement experiments and erosion by streams of particles. Examination of the rebounding particles as well as the eroded surface yields evidence of a significant adhesive mechanism for the ductile metals investigated.

N80-21492/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Fouling and the inhibition of Salt Corrosion.
Final Report.
D. L. Deadmore, and C. E. Lowell. Apr 80, 16p NASA-TM-81469, DOE/NASA/2593-80
Contract EF-77-A-01-2593

In an attempt to reduce fouling while retaining the beneficial effects of alkaline earth inhibitors on the hot corrosion of superalloys, the use of both additives and the intermittent application of the inhibitors were evaluated. Additions of alkaline earth compounds to combustion gases containing sodium sulfate were shown to inhibit hot corrosion. However, sulfate deposits can lead to turbine fouling in service. For that reason, dual additives and intermittant inhibitor applications were evaluated to reduce such deposit formation. Silicon in conjunction with varium showed some promise. Total deposition was apparently reduced while the inhibition of hot corrosion by barium was unimpaired. The intermittant application of the inhibitor was found to be more effective and controllable.

N80-21493/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Effects of Fine Porosity on the Fatigue Behavior of a Powder Metallurgy Superalloy.
R. V. Miner, Jr., and R. L. Dreshfield. 1980, 25p NASA-TM-81448, E-367
Presented at Ann. Meeting of the AM. Inst. Of Mining, Met. And Petroleum Engr., Las Vegas, Nev., 24-28 Feb. 1980.

Hot isostatically pressed powder metallurgy Astroloy was obtained which contained 1.4 percent fine porosity at the grain boundaries produced by argon entering the powder container during pressing. This material was tested at 650 C in fatigue, creep fatigue, tension, and stress-rupture and the results compared with previous data on sound Astroloy. The pores averaged about 2 micrometers diameter and 20 micrometers spacing. They did influence fatigue crack initiation and produced a more intergranular mode of propagation. However, fatigue life was not drastically reduced. A large 25 micrometers pore in one specimen resulting from a hollow particle did not reduce life by 60 percent. Fatigue behavior of the porous material showed typical correlation with tensile behavior. The plastic strain range life relation was reduced proportionately with the reduction in tensile ductility, but the elastic strain range-life relation was little changed reflecting the small reduction in sigma sub u/E for the porous material.

N80-21525/4 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Corrosion Fatigue in Titanium Alloys.
R. J. H. Wanhill. Nov 79, 35p NLR-MP-78039-U
Presented at Seeco 79 Soc. Of Environ. Engr., May 1979.

An overview of alpha and alpha-beta titanium alloy corrosion fatigue is given. Most data concern constant amplitude fatigue crack propagation, but there are also results for crack propagation under variable amplitude loading and for smooth and notched fatigue life tests. Several guidelines for maximizing the resistance to corrosion fatigue are established and their practical significance is discussed. It is concluded that crack propagation predictions, both for constant and variable amplitude loading, must account properly for the occurence of cyclic stress corrosion.

N80-21526/2 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
The Effect of Gust Load Alleviation on Fatigue and Crack Growth in Alclad 2024-T3.
J. B. Dejonge, and A. Nederveen. 6 Mar 79, 25p NLR-MP-79011-U
Presented at Astm Symp. On Effect of Load Spectrum Vehicles on Fatigue Crack Initiation and Propagation, San Francisco, May 1979.

Fatigues tests under flight simulation loading were done on simply notched sheet specimens made of ALCLAD 2024-T3 to assess the fatigue life increase obtained by gust alleviation. Test results did show an important increase in crack initiation life, but crack propagation life was little affected. The observed effect on fatigue life could be reasonably well predicted by Miner type life calculations. Miner type calculations, however, are bound to fail in predicting the effect of spectrum-variations such as deletion of g.a.g. cycle or small gust cycles.

N80-21528/8 PC **A04**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (Germany, F.R.). Inst. fuer Werkstoff-Forschung.
Influence of Microstructure and Test Temperature on Tensile and Creep Properties of Titanium Alloys.
A. Gysler, and G. Luetjering. Jul 79, 68p DFVLR-FB-79-24

Short time tensile and creep tests were carried out at elevated temperatures up to 600 deg C on age hardened Ti-Al, Ti-Mo, Ti-6Al-4V, and Ti-8.8Al-4V alloys. The microstructural parameters studied include degree of particle hardening, grain, size, morphology and dimensions of alpha and beta phases, oxygen content and texture. The temperature dependance of the yield stress was influenced only by the oxygen content, while through variations of all other parameters the absolute yield stress values were varied by constant amounts over the whole test temperature range studied. The highest creep resistance was obtained for those microstructures which exhibited a large volume fraction of small coherent particles.

N80-21534/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Adhesion, Friction, and Wear of Binary Alloys in Contact with Single-Crystal Silicon Carbide.
K. Miyoshi, and D. H. Buckley. 1980, 24p NASA-TM-79262, E-221
Prepared for the Intern. Joint Lubrication Conf., San Francisco, 18-21 Aug. 1980; Cosponsored by Asme and the AM. Soc. Of Lubrication Engr.

Sliding friction experiments, conducted with various iron base alloys (alloying elements are Ti, Cr, Mn, Ni, Rh and W) in contact with a single crystal silicon carbide /0001/ surface in vacuum are discussed. Results indicate atomic size misfit and concentration of alloying elements play a dominant role in controlling adhesion, friction, and wear properties of iron-base binary alloys. The controlling mechanism of the alloy properties is as an intrinsic effect involving the resistance to shear fracture of cohesive bonding in the alloy. The coefficient of friction generally increases with an increase in solute concentration. The coefficient of friction increases as the solute-to-iron atomic radius ratio increases or decreases from unity. Alloys having higher solute concentration produce more transfer to silicon carbide than do alloys having low solute concentrations. The chemical activity of the alloying element is also an important parameter in controlling adhesion and friction of alloys.

N80-21551/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Mechanical Impact Tests of Materials in Oxygen Effects of Contamination.
P. M. Ordin. Apr 80, 36p NASA-TP-1571, E-047

The effect of contaminants on the mechanical impact sensitivity of Teflon, stainless steel, and aluminum in a high-pressure oxygen environment was investigated. Uncontaminated Teflon did not ignite under the test conditions. The liquid contaminants - cutting oil, motor lubricating oil, and toolmaker dye - caused Teflon to ignite. Raising the temperature lowered the impact energy required for ignition. Stainless steel was insensitive to ignition under the test conditions with the contaminants used. Aluminum appeared to react without contaminants under certain test conditions; however, contamination with cutting oil, motor lubricating oil, and toolmakers dye increased the sensitivity of aluminum to mechanical impact. The grit contaminants silicon dioxide and copper powder did not conclusively affect the sensitivity of aluminum.

ORNL-5609 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Ultrasonic Wave Propagation in Materials with Orthotropic (Orthorhombic) Symmetry with an Example of Centrifugally Cast Pipe.
D. W. Fitting, L. Adler, and K. V. Cook. Feb 80, 77p
Contract W-7405-ENG-26

The propagation of elastic waves in orthotropic and hexagonal anisotropic material is examined mathematically showing that the elastic constants for these materials may be ascertained from ultrasonic longitudinal and transverse wave velocity measurements. Knowledge of the elastic constants of the material permits calculation of the velocities of longitudinal and transverse waves propagating in any direction. Experimental velocity measurements on samples of centrifugally cast austenitic stainless steel pipe are presented. They compare favorably with theoretical predictions, assuming an orthotropic model. (ERA citation 05:013891)

PATENT-4 162 157
Not available NTIS
Department of Energy, Washington, DC.
Secondary Hardening Steel Having Improved Combination of Hardness and Toughness.
Patent,
E. R. Parker, V. F. Zackay, M. S. Bhat, and W. M. Garrison, Jr. Filed 15 May 78, patented 24 Jul 79, 6p PAT-APPL-906 308
Supersedes PAT-APPL-906 308-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A secondary hardening alloy steel composition consisting essentially of about 0.25 to 0.5% carbon, about 0.5 to 1.0% manganese, about 1.5 to 3.0% nickel, about 0 to 1.0% chromium, about 1.75 to 2.5% molybdenum, about 0 to 0.4% vanadium, and an additive selected from about 1 to 3% aluminum and a combination of at least about 1% aluminum and at least about 1% silicon for a combined Al + Si content of about 2 to 4%, the balance being iron and impurity elements. The present steel composition has the following characteristics: it exhibits a flat tempering response, it is hardenable upon tempering to a Rockwell C hardness of at least 50, and it has an improved combination of hardness vs toughness properties after tempering in the secondary hardening range. A method of preparation is also described. 8 claims. (ERA citation 05:020868)

PATENT-4 162 158
Not available NTIS
Department of Energy, Washington, DC.
Ferritic Fe-Mn Alloy for Cryogenic Applications.
Patent,
S. K. Hwang, and J. W. Morris, Jr. Filed 28 Dec 78, patented 24 Jul 79, 4p PAT-APPL-973 844
Supersedes PAT-APPL-973 844-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A ferritic, nickel-free alloy steel composition, suitable for cryogenic applications, which consists essentially of about 10 to 13% manganese, 0.002 to 0.01% boron, 0.1 to 0.5% titanium, 0 to 0.05% aluminum, and the remainder iron and incidental impurities normally associated therewith. 2 claims. (ERA citation 05:020867)

PEL-266 PC **A06**/MF **A01**
Atomic Energy Board, Pelindaba, Pretoria (South Africa).
Effects of Neutron Radiation on Some South African Produced 300 Series Austenitic Stainless Steels.
J. R. Dalton. Oct 78, 101p
U.S. Sales Only.

This study was undertaken to gauge the performance of South African-produced 300 series stainless steels under neutron irradiation and to compare this performance with that of reactor-grade equivalent steels produced overseas. Specimens of AISI 304, 316 and 321 type stainless steels were irradiated in the core of the SAFARI-1 reactor at Pelindaba in French-manufactured Chouca 'O'

type irradiation rigs housed within a fast-neutron flux converter. Fast (> 1 MeV) and thermal-neutron doses in excess of l,0 x10 exp 21 .cm exp -2 were achieved during the irradiations. Post-irradiation tensile tests were carried out on a W-type Hounsfield Tensometer modified for remote operation at a range of temparatures from room temperature to 800 degrees Celcius. The results of these tests are presented graphically. The tensile results are supported by optical metallography on the irradiated specimens. (Atomindex citation 10:476257)

PNL-SA-6698 PC **A03/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Krypton Entrapment In Pulse Biased Sputter-Deposited Metals.
M. A. Bayne, R. W. Moss, and E. D. McClanahan. 1978, 27p CONF-780430-7
Contract EY-76-C-06-1830
Conference on metallurgical coatings, San Francisco, CA, USA, 3 Apr 1978.

A supported gas discharge sputtering system was constructed to investigate krypton entrapment in high-rate sputter-deposited thick films. Krypton entrapment was studied as a function of substrate and target voltage for nickel, aluminum, titanium and iron deposits. Control of substrate and target voltages was achieved with pulse circuits capable of adjusting the pulse duration and repetition rate. A water-cooled cylindrical copper substrate 15 cm in diameter was used to collect the sputtered metal from a 9-cm diameter cylindrical target. To observe the immediate effect of changes in sputtering parameters on gas trapping, as well as measure the total gas trapped, a sensitive mass flow indicator was installed in the krypton supply of the dynamically pumped system. Data relating krypton content to substrate bias conditions and deposition rate are discussed in light of the theory of Carter, Colligon and Leck on ion absorption in the presence of sputtering. Krypton contents > 2 at.% were found in the metals studied, all of which were deposited at rates exceeding 1 nm/sec. Computed krypton concentrations agreed with concentrations in samples that were analyzed chemically. (ERA citation 05:013897)

SAND-79-8504 PC **A04/MF A01**
Sandia Labs., Livermore, CA.
Effects of Testing and Storage Environments on Mechanical Properties of Ni-Plated and Bare U-3/4 Wt% Ti.
S. W. Zehr, H. R. Johnson, J. E. Smugeresky, K. A. Pashman, and A. S. Nagelberg. Jan 80, 58p
Contract EY-76-C-04-0789

It was found that storage environments with an adequate supply of oxygen can effectively minimize moisture corrosion of bare U-3/4 Ti. In particular, 0.75 cm exp 3 of dry air is calculated to protect 1 cm exp 2 of U-3/4 Ti for 20 years storage at room temperature. Consideration of the geometric details of U-3/4 Ti alloy specimens and the free volumes of air (and hence O sub 2) available can satisfactorily explain discrepancies in corrosion behavior between recent tests and previously reported data. The storage environment at 70 exp 0 C produces a minor strength increase in bare samples with increasing time. Decreases in ductility are observed for testing conditions of low temperature, low strain rate, and/or high humidity. Surface cracks occur under the same conditions conducive to corrosion, i.e., moderate temperatures, low strain rates, and high humidity. Significant increases in strength result under low-temperature and high-strain-rate conditions of tensile testing. Residual chloride contamination may be responsible for the occasional and otherwise unexplained large scatter in ductility for nominally similar specimens and test conditions. Nickel plating is observed to cause a statistically significant decrease in tensile strength, but no effect on the yield strength or ductility was observed and the presence of high explosive during the aging of tensile bars was observed to have no effect on mechanical properties. (ERA citation 05:016149)

SAND-79-8730 PC **A03/MF A01**
Sandia Labs., Livermore, CA.
Alloy Selection for Sulfidation: Oxidation Resistance in Coal Gasification Environments.
R. W. Bradshaw, and R. E. Stoltz. Jan 80, 39p
Contract EY-76-C-04-0789

A series of iron-nickel-chromium and nickel-chromium alloys were studied for their combined sulfidation-oxidation resistance in simulated coal gasification environments. All alloys contained a minimum of 20 w/o chromium, and titanium and aluminum in the range 0 to 4 w/o. Corrosion resistance was evaluated at 1255 exp 0 K (1800 exp 0 F) in both high BTU and low BTU coal gasification atmospheres with 1 v/o H sub 2 S. Titanium at levels greater than 1 w/o imparted significant sulfidation resistance due to an adherent, solid solution chromium-titanium oxide layer which prevented sulfur penetration. Aluminum was less effective in preventing sulfidation since surface scales were not adherent. Of the commercial alloys tested, Nimomic 81, Pyromet 31, IN801, and IN825 exhibited the best overall corrosion resistance. However, futher alloy development, tailored to produce solid solution chromium-titanium oxide scales, may lead to alloys with greater sulfidation-oxidation resistance than those investigated here. (ERA citation 05:012935)

UCID-18523 PC **A02/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
Radiation Effects on Superconductors and Magnet Stabilizer Materials.
R. A. Van Konynenburg, and M. W. Guinan. Jan 80, 8p
Contract W-7405-ENG-48

Previously-irradiated Nb sub 3 Sn wires have been given additional irradiation at room temperature in order to reach the anticipated serious decline in critical current and to evaluate the fluence where it occurs. In addition, an experiment is in preparation which will measure the magnetoresistance of copper and aluminum in fields up to 12 tesla after 14-MeV neutron irradiation. The same experiment will test the effects of repeated irradiation and room temperature annealing on NbTi critical current. (ERA citation 05:013915)

UCRL-52866 PC **A08/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
Use of Notched Beams to Establish Fracture Criteria for Beryllium.
R. A. Mayville. 4 Jan 80, 151p
Contract W-7405-ENG-48
Thesis.

The fracture of an improved form of pure beryllium was studied under triaxial tensile stresses. This state of stress was produced by testing notched beams, which were thick enough to be in a state of plane strain at the center. A plane strain, elastic-incremental plasticity finite element program was then used to determine the stress and strain distributions at fracture. A four-point bend fixture was used to load the specimens. It was carefully designed and manufactured to eliminate virtually all of the shear stresses at the reduced section of the notched beams. The unixial properties were obtained. (ERA citation 05:013901)

WAPD-TM-1426 PC **A08/MF A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Out-of-Pile Accelerated Hydriding of Zircaloy Fasteners.
J. C. Clayton. Oct 79, 173p
Contract EY-76-C-11-0014

Mechanical joints between Zircaloy and nickel-bearing alloys, mainly the Zircaloy-4/Inconel-600 combination, were exposed to water at 450 exp 0 F and 520 exp 0 F to study hydriding of Zircaloy in contact with a dissimilar metal. Accelerated hydriding of the Zircaloy occurred at both temperatures. At 450 exp 0 F the dissolved hydrogen level of the water was over ten times that at 520 exp 0 F. At 520 exp 0 F the initially high hydrogen ingress rate decreased rapidly as exposure time increased and was effectively shut off in about 25 days. Severely hydrided Zircaloy components successfully withstood thermal cycling and mechanical testing. Chromium plating of the nickel-bearing parts was found to be an effective and practical barrier in preventing nickel-alloy smearing and accelerated hydriding of Zircaloy. (ERA citation 05:013567)

11H. Oils, Lubricants, and Hydraulic Fluids

IFVE-LRI-77-11 PC **A02/MF A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Changes in Structure and Properties of Mineral Oils Irradiated at a Proton Accelerator.
V. E. Borodin, K. K. Pokrovskii, and V. N. Solov'ev. 1977, 12p
In Russian.
U.S. Sales Only.

Experimental data are presented on the variation of the structure and of the properties of industrial and vacuum oils after irradiation in secondary radiation fields of accelerators of protons of 70, 7 and 0.66 GeV. The results of investigations are compared with data on the irradiation of above oils by Co exp 60 gamma -quanta. Investigated were the kinematic viscosity and the acid number. The variation of the post-irradiation structure was evaluated in terms of infrared absorption spectra. The main factor causing a sharp rise in the viscosity of oil after irradiation in accelerators is the radiation oxidation which develops at low-power radiation dose of accelerators. The dependences of the variation in viscosity upon the dose and the dose power have been established for all the investigated oils, this making it possible to predict the viscosity variation on radiation in fields of different radiation levels. (Atomindex citation 10:420711)

N80-21490/1 PC **A02/MF A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Tribological Properties of Sputtered MOS sub 2 Films in Relation to Film Morphology.
T. Spalvins. Mar 80, 17p NASA-TM-81465, E-394
Presented at the Intern. Conf. On Met. Coatings, San Diego, 21-25 Apr. 1980; Sponsored by the AM. Vacuum Soc.

Thin sputter deposited MoS2 films in the 2000 to 6000 A thickness range have shown excellent lubricating properties, when sputtering parameters and substrate conditions are properly selected and precisely controlled. The lubricating properties of sputtered MoS2 films are strongly influenced by their crystalline-amorphous structure, morphology and composition. The coefficient of friction can range from 0.04 which is effective lubrication to 0.4 which reflects an absence of lubricating properties. Visual screening and slight wiping of the as-sputtered MoS2 film can identify the integrity of the film. An acceptable film displays a black-sooty surface appearance whereas an unacceptable film has a highly reflective, gray surface and the film is hard and brittle.

11I. Plastics

AD-A083 129/7 PC **A03/MF A01**
Colorado State Univ Fort Collins Dept of Chemistry
Heat Stable Polymers: Polyquinolines and other Aromatic Polymers.
Final rept. Jan 77-Dec 79,
J. K. Stille. 1 Jan 80, 35p ARO-15303.12-C
Grant DAAG29-77-G-0177

Polyquinolines can be synthesized by an acid catalyzed polymerization reaction that allows a variety of structural modifications, resulting in a range of chain stiffness that can be altered from a relatively flexible amorphous polymer with a moderately low glass transition temperature (250 deg C) to a rod-like molecule with a high degree of crystallinity and a high crystalline transition temperature (>550 deg C). Fibers can be spun and films cast from solution. The rigid rod polyquinolines form anisotropic solutions and, as a result, produce crystalline fibers with a high degree of orientation and a high modulus. A series of polyquinolines containing biphenylene units in the main chain were prepared in order to effect crosslinking reactions of these materials. Crosslinking took place thermally, above the Tg of the polymer, to give insoluble polymers with higher Tg's and higher moduli both above and below Tg. Transition metals catalyze the crosslinking reactions, allowing lower curing temperatures. Polyaramides, polybenzimidazoles and polyquinoxalines could be similarly crosslinked by incorporating biphenylene into these polymers. (Author)

AD-A083 244/4 PC A02/MF A01
Army Aviation Research and Development Command St Louis MO
An Investigation of the Impact Behavior of Vacuum-Formed Tetracore.
Technical memo.,
I. E. Figge, Sr. Mar 80, 20p Rept no. USAAVRADCOM-TM-80-D-6

Vacuum-formed cellulose butyl-acetate Tetracore specimens were subjected to flatwise compression, torsion, and three-point bending tests to compare the results with a three-dimensional finite element computer program which was specifically developed to analyze Tetracore structures. Results indicate that the computer program is capable of accurately predicting the deflection of Tetracore panels with face sheets. In addition, low velocity impact tests at 10 and 14 fps were conducted to determine the energy-absorbing characteristics. The results indicate that the basic geometry of Tetracore provides an inherent energy-absorbing capability due to the accordion-type failure mode if ductile materials are used. (Author)

AD-A083 280/8 PC A02/MF A01
Texas A and M Univ College Station Dept of Chemistry
Polymer-Bound Alkali Metal Aromatic Radical Anions.
Interim technical rept.,
David E. Bergbreiter, and James M. Killough. 31 Mar 80, 5p Rept no. TR-5
Contract N00014-77-C-0426

Polystyrene bound anthracene has been prepared and found to react with sodium naphthalene to give a polymeric radical anion whose chemistry is analogous to soluble alkali metal aromatic radical anions. (Author)

AD-A083 494/5 PC A03/MF A01
Wyoming Univ Laramie Dept of Mechanical Engineering
Fatigue Behavior of Hercules 3501-6 Epoxy Resin.
Final rept. Sep 78-Dec 79,
David E. Walrath, and Donald F. Adams. 25 Jan 80, 45p UWME-DR-004-101-1, NADC-78139-60
Contract N62269-78-C-0340

Plates and solid rods of Hercules 3501-6 neat epoxy were cast, from which tensile, compressive and torsional shear specimens were machined. Half of the tensile specimens were moisture-preconditioned for six months at 65 C in a 98% RH environment. Room temperature static and fatigue tests were conducted, and a scanning electron microscope used to examine representative failure surfaces. Stress versus number of cycles to failure plots were prepared. (Author)

AD-A083 538/9 PC A02/MF A01
Foreign Technology Div Wright-Patterson AFB OH
Electro-Insulating Products Made of Silicone Resins.
Alicja Zgadzaj. 3 May 79, 14p Rept no. FTD-ID(RS)T-0466-79
Edited trans. of Wiadomosci Elektrotechniczne (Poland) v45 n16 p431-433 1977, by Ilia Kimmelfeld.

No abstract available.

BDX-613-2416 PC A03/MF A01
Bendix Corp., Kansas City, MO.
Thumb Tack Physical Model Evaluation of Polystyrene Bead Foam as an Encapsulant for Electronic Packages.
D. J. Fossey, and G. D. Swanson. Mar 80, 33p
Contract EY-76-C-04-0613

A physical model in the shape of a thumb tack is used to measure forces on electronic component lead wires when soldered into printed wiring boards. Encapsulation of electronic packages in polystyrene bead foam of 0.2, 0.3, 0.4, 0.5, and 0.6 g/cm exp 3 densities was evaluated. No solder joint damage was seen. Crushing pressures on metal transistors also were safe for all densities. Experimental data agreed well with theoretical calculations based on the concept of constrained thermal expansion. (ERA citation 05:016331)

JAERI-M-7491 PC A02/MF A01
Japan Atomic Energy Research Inst., Tokyo.
Improvement of Glass Transition Temperature of Tetrafluoroethylene and Propylene Copolymer.
J. Okamoto, and M. Ito. Jan 78, 15p
In Japanese.
U.S. Sales Only.

The glass transiton temperature (T sub(g)) of polymers depends on chemical structure of the monomer unit; i.e. flexibility of chain, steric hindrance, bulkiness of side groups and its flexibility, and symmetry of polymer. In the present study, an attempt was made to lower the glass transition temperature of tetrafluoroethylene and propylene copolymer by way of its terpolymerization with addition of a third monomer such as olefine, vinyl ether, acrylate or vinyl fluoride. In most of the terpolymers obtained T sub(g) is lowered but also the degradation temperature (T sub(d)), except in the butene-1 and n-butylacrylate terpolymers. T sub(g) and T sub(d) of the terpolymer with butene-1 are -17 exp 0 C and 355 exp 0 C respectively. In the terpolymer with n-butylacrylate, T sub(g) and T sub(d) are -31 exp 0 C -- -53 exp 0 C and 260 exp 0 C -- 300 exp 0 C respectively. (Atomindex citation 09:410630)

JAERI-M-7492 PC A02/MF A01
Japan Atomic Energy Research Inst., Tokyo.
P-V-T Property of a Tetrafluoroethylene and Propylene Mixture.
H. Watanabe, and J. Okamoto. Jan 78, 11p
In Japanese.
U.S. Sales Only.

The relation between pressure and temperature of a tetrafluoroethylene and propylene mixture was measured at constant volume to obtain chemical engineering data for design of the polymerization apparatus. From this measurement, P-V-T property of the mixtures of various compositions at different densities was determined. Critical points for the mixture compositions were determined from the pressure-temperature curves. The critical temperature vs. propylene concentration of the mixture is not proportional. The compressibility factors calculated with the critical points are in good agreement with the z-chart proposed by Weber. The critical points are thus reasonable, so thereby physical properties of the mixtures can be estimated. Saturated liquid densities of the mixtures of various compositions could thus be estimated. (Atomindex citation 09:410582)

PB80-174931 PC A03/MF A01
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Explosibility of Dusts Used in the Plastics Industry.
Rept. of investigations,
Murray Jacobson, John Nagy, and Austin R. Cooper. 1962, 35p BUMINES-RI-5971

Facts obtained by the Bureau of Mines on the dust-explosion hazard in air of materials used in the plastics industry are presented for 313 samples studied in the laboratory. Information is given on ignition temperature of dust clouds and layers, minimum explosive concentration, minimum energy required for ignition, explosion pressure and rates of pressure rise, amount of inert dust required to prevent ignition and flame propagation, and, in some instances, on the limiting oxygen concentration in an atmosphere to prevent ignition by spark and by heated surface. The effects of particle shape, additives, and resin structure on explosibility are discussed. Relative explosibility of the materials is related to the ignition sensitivity and explosion severity and is denoted by an empirical index. Recognition of the degree of hazard will facilitate adoption of adequate measures for preventing ignition and explosion during manufacturing or processing.

SGAE-2035 PC A02/MF A01
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Oxidation Processes During the Radiation Crosslinking of Low-Density Polyethylene.
R. Schaudy, and H. Kalteis. Nov 77, 23p CH-217/77
In German.
U.S. Sales Only.

The radiation-induced oxidation of Low-density polyethylene under gamma and electron beam irradiation has been investigated using infrared spectrometry and gel extraction. The irradiation were performed under technical conditions in air or in an inert gas atmosphere. After gamma irradiation in air the 100 mu m thick foils showed quite severe oxidation and almost complete inhibition of cross-linking. Using 1mm thick plates, still a considerable inhibition took place. In irradiation with high dose-rates (electron accelerator) only low or moderate oxidation was observed in air as well as in inert gas atmosphere (channel), whereas under inert gas in a casket oxidation could be completely avoided. Under these conditions the crosslinking was influenced but little. After gamma irradiation in air no trans-vinylene absorption could be detected, under nitrogen to a small extent only. However, upon electron irradiation in diverse atmosphere it increased with increasing dose. The consequences for technical irradiations are to be discussed. (Atomindex citation 09:414362)

11J. Rubbers

AD-A083 168/5 PC A03/MF A01
Akron Univ OH Inst of Polymer Science
Tear Strength and Tensile Strength of Model Filled Elastomers.
Technical rept.,
P. Dreyfuss, A. N. Gent, and J. R. Williams. 10 Apr 80, 29p Rept no. TR-7
Contract N00014-76-C-0408

Measurements have been made of the tear strength, tensile strength, and energy dissipated during stretching for model filled elastomers consisting of polybutadiene with glass beads incorporated. The glass beads were pretreated with various silanes, some of which could, in principle, form covalent bonds with the polybutadiene matrix during free-radical crosslinking of the latter and some of which could not. The tear strength of the elastomer was increased by the addition of glass beads, by about 25 per cent for the largest beads, having a mean diameter of 150 micrometers. This effect is attributed to increased roughness of the tear path. The breaking elongation in tension was reduced by the addition of glass beads but the breaking stress was only seriously reduced for the least-well-adhering beads.

AD-A083 609/8 PC A04/MF A01
California Inst of Tech Pasadena Graduate Aeronautical Labs
Dynamic Fracture in Viscoelastic Solids.
Annual rept. no. 1, Aug 78-Aug 79,
Mool C. Gupta, and Wolfgang G. Knauss. Mar 80, 53p Rept no. GALCIT-SM-80-5
Contract N00014-78-C-0634

The purpose of our studies is to gain fundamental information on the failure of elastomers, both unfilled and filled with particulate material; specially to determine the amount of fragmentation that occurs on failure under dynamic conditions. Experimental information sought relates to crack velocity and crack branching. At present we are studying the onset of crack propagation, and possible crack branching in elastomers using high speed cinematography under loads induced with an electromagnetic loading device. In this report we describe the material preparation, experimental technique and some preliminary results obtained on crack growth in Solithane (a polyurethane elastomer). (Author)

JAERI-M-7485 PC A04/MF A01
Japan Atomic Energy Research Inst., Tokyo.
Radiation Chemistry in High Pressure Paying Attention to Molecular Motion and Alignment.
T. Sasuga. Jan 78, 73p
In Japanese.
U.S. Sales Only.

Effects of high pressure or radiation-induced cross-linking of synthetic rubbers and polymerization of methacrylates and acrylonitrile (AN) have been studied paying attention to molecular motion and alignment. The following were revealed from radiation-induced crosslinking reaction, pressure-volume-temperature (P-V-T) measurement and chemical relaxation of polymer crosslinked at high pressure: (1) The rate of crosslinking is increased in compression especially in polymers containing double bonds, due to chain reaction through

double bonds. (2) Crosslinking points of the polymer with double bonds crosslinked at high pressure are dispersed as cluster. (3) Crosslinking reaction is intimately related with change of the molecular motion in a polymer under pressure. Van't Hoff plots of methacrylates and AN breaked at a pressure depending on the monomer. The pressure giving the breaks depends on length of methacrylate. P-V curves of the polymer-monomer coexistence system as-polymerized exhibit peculiar behavior at the pressure giving the breaks. AN exhibits complicated polymerization behavior at a pressure changing compressibility of the monomer. From above results etc. it is concluded that monomer molecules are aligned in short range at a pressure corresponding to geometrical structure of the monomer molecules. (Atomindex citation 09:410639)

JAERI-M-7498 PC **A04/MF A01**
Japan Atomic Energy Research Inst., Tokyo.
Radiation-Induced Emulsion Copolymerization of Tetrafluoroethylene with Propylene in Flow System, 4. Operation Manual of the Apparatus.
H. Watanabe, J. Okamoto, O. Matsuda, and S. Machi. Feb 78, 67p
In Japanese.
U.S. Sales Only.

By radiation-induced emulsion copolymerization of tetrafluoroethylene with propylene, an elastomer excellent in thermal and chemical resistance is produced. For engineering study of the process, flow apparatus was designed and constructed. Given in the operation manual are an outline of the apparatus, start and shutdown, control of the reaction, emergency countermeasures, and handling of the equipment. Operation safety of the manual has been confirmed in an ad hoc committee of the establishment. (Atomindex citation 09:411432)

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A083 045/5 PC **A03/MF A01**
Virginia Polytechnic Inst and State Univ Blacksburg
Shewhart X-Charts (Average X) with Estimated Process Variance.
Technical rept.,
B. K. Ghosh, Marian R. Reynolds, and Yer Van Hui. Mar 80, 31p RR-Q-4, ARO-15194.4-M
Grant DAAG29-78-G-0172

Properties of the Shewart X-chart (average x) for controlling the mean of a process with a normal distribution are investigated for the situation where the process variance sigma-squared must be estimated from initial sample data. The control limits of the X-chart (average x) depend on the estimate of sigma-squared and thus, unlike the case when sigma-squared is known, the X-chart (average x) is not equivalent to a sequence of independent tests. When sigma-squared is estimated the distribution of the run length is not geometric and cannot be characterized simply in terms of the probability of a signal at a given point. The average run length (ARL) for the X-chart (average x) is expressed in terms of an integral involving the normal cdf, and it is shown that the chart signals with probability one, but the ARL may not be finite if the size of the sample used to estimate sigma-squared is sufficiently small. In addition, certain bounds for the ARL are also derived. Numerical integration is used to show that the effect of using small sample sizes in estimating sigma-squared is to increase the ARL and the variance of the run-length distribution. (Author)

AD-A083 109/9 PC **A02/MF A01**
California Univ Santa Barbara Inst for Algebra and Combinatorics
Linear Groups Defined by Decomposable Tensor Equalities,
Marvin Marcus, and John Chollet. 6 Nov 78, 9p
AFOSR-TR-80-0267
Contract F49620-78-C-0030
Pub. in Linear and Multilinear Algebra, v8 p207-212 1980.

No abstract available.

AD-A083 130/5 PC **A06/MF A01**
Honeywell Systems and Research Center Minneapolis MN
Optimal Linear Control.
Final rept.,
C. A. Harvey, M. G. Safonov, G. Stein, and J. C. Doyle. Dec 79, 118p 79SRC87, ONR-CR215-238-4F
Contract N00014-75-C-0144

This is the final report on a multi-year research program to bridge the gap between modern control theory and practical control system design. The results of the total program are summarized and the last year's results are described in detail. Characterizations of optimal linear controls have been derived, from which guides for selecting the structure of the control system and the weights in the performance index were developed, so that optimal controls meeting conventional design specifications can be designed for single-input systems. For multi-input systems a method of selecting weights for the performance index on the basis of desired closed-loop modal properties and system bandwidth was developed. For such systems it was also found that optimal controls which use state estimators have no guaranteed stability margins, and a method was developed for adjusting the state estimator design so that good margins could be obtained. It was also found that single-loop stability margins in multi-input systems were inadequate measures of robustness, the quality of stability being preserved for a class of perturbations of system characteristics. A new measure of robustness expressed in terms of singular values was developed which is a valid generalization of the concept of stability margins for single-input systems. A method for estimating bounds on system perturbations in terms of singular values associated with parameter uncertainties and unmodeled dynamics, including some forms of nonlinearities, is described in detail in this report. Illustrative examples have been treated in each phase of the program. In this report such an example is presented, demonstrating the se of singular value analysis in design.

AD-A083 170/1 PC **A02/MF A01**
Stanford Univ CA Dept of Computer Science
Updating Formulae and a Pairwise Algorithm for Computing Sample Variances.
Technical rept.,
Tony F. Chan, Gene H. Golub, and Randall J. LeVeque. Nov 79, 21p Rept no. STAN-CS-79-773
Grant DAAG29-78-G-0179
Prepared in cooperation with Yale Univ., New Haven.

A general formula is presented for computing the sample variance for a sample of size m + n given the means of variances for two subsamples of sizes m and n. This formula is used in the construction of a pairwise algorithm for computing the variance. Other applications are discussed as well, including the use of updating formulae in a parallel computing environment. We present numerical results and rounding error analyses for several numerical schemes. (Author)

AD-A083 175/0 PC **A02/MF A01**
California Univ Berkeley Operations Research Center
Bayesian Nonparametric Statistical Inference for Shock Models and Wear Processes.
Research rept.,
Albert Y. Lo. Dec 79, 24p Rept no. ORC-79-18
Contract N00014-75-C-0781

Statistical procedures for shock models and wear processes are considered in this paper. We show that independent gamma-Dirichlet priors are conjugate priors when sampling from these shock models. Bayes rules given the observations are computed. In particular, we calculate the Bayes estimates of the survival probabilities for these models. We show consistency of the posterior distribution as well as weak convergence of the centered and suitably rescaled posterior processes. (Author)

AD-A083 176/8 PC **A02/MF A01**
Stanford Univ Calif Dept of Computer Science
On Constant Weight Codes and Harmonious Graphs.
Technical rept.,
R. L. Graham, and N. J. A. Sloane. Dec 79, 19p Rept no. STAN-CS-79-777
Contract N00014-76-C-0330, Grant NSF-MCS77-23738

Very recently a new method has been developed for finding lower bounds on the maximum number of codewords possible in a code of minimum distance d and length n. This method has led in turn to a number of interesting questions in graph theory and additive number theory. In this brief survey we summarize some of these developments. (Author)

AD-A083 192/5 PC **A02/MF A01**
Stanford Univ CA Dept of Computer Science
Relation Between the Complexity and the Probability of Large Numbers.
Technical rept.,
Peter Gacs. Sep 79, 11p Rept no. STAN-CS-79-765
Contract N00014-76-C-0330, Grant NSF-MCS77-23738

H(x), the negative logarithm of the apriori probability M(x), i s Levin's variant of Kolmogorov's complexity of a natural number x. Let alpha(n) be the minimum complexity of a number larger than n, s(n) the logarithm of the apriori probability of obtaining a number larger than n. It was known that $s(n) < \text{or} = \text{alpha}(n) < \text{or} = s(n) + H(s(n))$. We show that the second estimate is in some sense sharp.

AD-A083 251/9 Not available NTIS
Alberta Univ Edmonton
Discontinuous Scalar Functions and Ordinary Differential Equations,
James S. Muldowney. 26 Mar 72, 11p DRB-REPRINT-4113
Availability: Pub. in Mathematical Systems Theory, v8 n1 p45-54 1974 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 252/7 Not available NTIS
Alberta Univ Edmonton
On an Inequality of Peano,
James S. Muldowney. 11 May 71, 4p DRB-REPRINT-4114
Availability: Pub. in Canadian Mathematical Bulletin, v16 n1 p79-82 1973 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 288/1 PC **A03/MF A01**
Stanford Univ CA Dept of Computer Science
The Analysis of Sequential Experiments with Feedback to Subjects.
Technical rept.,
Persi Diaconis, and Ronald Graham. Nov 79, 50p Rept no. STAN-CS-79-775
Contracts N00014-76-C-0330, EY-76-C-03-0515
Sponsored in part by Grants NSF-MCS77-23738 and NSF-MCS77-16974.

A problem arising in taste testing, medical, and parapsychology experiments can be modeled as follows. A deck of n cards contains c(i) cards labeled i, $1 < \text{or} = i < \text{or} = r$. A subject guesses at the cards sequentially. After each guess the subject is told the card just guessed (or at least if the guess was correct or not). We determine the optimal and worst case strategies for subjects and the distribution of the number of correct guesses under these strategies. We show how to use skill scoring to evaluate such experiments in a way which (asymptotically) does not depend on the subject's strategy. (Author)

AD-A083 293/1 PC **A03/MF A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
The Convergence of Two Series Representations for Associated Legendre Functions of the First and Second Kind.
Final rept.,
James N. Walbert, and Kathleen L. Zimmerman. Feb 80, 47p ARBRL-MR-02990, AD-E430 395

The regions of convergence and divergence of two series representations for associated Legendre

functions of the first and second kind degree nu and order mu, are investigated. The series are shown to be absolutely convergent when the real part of the complex order mu is less than zero, conditionally convergent when the real part of mu is greater than or equal to zero and less than one-half, and divergent when the real part of mu is greater than or equal to one-half. Numerical calculations for several real values of nu and mu are used to demonstrate the behavior of the partial sums of the series in the regions of convergence and divergence.

AD-A083 422/6 Not available NTIS
Royal Statistical Society London (England)
Statistical Algorithms, AS 67-AS 71, AS R9.
1974, 21p DRB-REPRINT-4065
Availability: Pub. in Applied Statistics, v23 n1 p83-102 1974 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 514/0 PC **A12**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Continuous Density Approximation on a Bounded Interval Using Information Theoretic Concepts.
Doctoral thesis,
James E. Miller, Jr. Mar 80, 265p Rept no. AFIT/DS/MA/80-1

This report presents the theoretical development and numerical implementation of a procedure for approximating continuous probability density functions on a bounded interval. The work is applicable to Bayesian decision models and that available information is used to update or obtain the prior distribution. The procedure is based on the solution of a constrained entropy maximization problem and requires information in the form of expected values of information functions. The approach involves three steps: estimation of expected (or average) values of potential information functions, selection of the active subset of functions to define the approximation family, and simultaneous solution of the constraints to select the specific approximating density for a given set of data. A useful set of potential information functions is developed, and three numerical methods for active set selection are demonstrated. Numerical techniques for expected value computation are discussed, and a scheme for solution of the constraints is developed and implemented. Theoretical development includes theorems on form and uniqueness. Approximation accuracy is related to potential set definition and data accuracy. The procedure is applied to several known distributions to demonstrate applicability. Applications to computer simulation and interval arithmetic models are demonstrated with specific examples. (Author)

AD-A083 521/5 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
Ridge Estimation in Linear Regression.
Technical rept.,
James S. Hawkes. Oct 76, 11p Rept nos. N80, TR-232
Contract N00014-75-C-0451

Consider the linear regression model Y = X Theta + epsilon. Recently, a class of estimators, variously known as ridge estimators, has been proposed as an alternative to the least squares estimators in the case of collinearity, that is, when the design matrix X'X is nearly singular. The ridge estimator is given by Theta-cap = (1/(X'X + KI)) X'Y, where K is a constant to be determined. An optimal choice of the value of K is not known. This paper examines the risk (mean squared error) of the ridge estimator under the constraint Theta'Theta < r or = c and determines optimal values of K for which the risk is smaller than the risk of the least squares estimators where c is a constant. (Author)

AD-A083 522/3 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
Statistical Inference in a New Bivariate Failure Model,
Thomas J. Tosch, and Paul T. Holmes. 5 Oct 76, 22p Rept nos. N76, TR-234
Contract N00014-71-A-0339-0002

In a previous paper a new general bivariate failure model was introduced and its properties investigated. Here we consider the problem of parameter estimation in the exponential case for both complete and incomplete samples. (Author)

AD-A083 523/1 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
A Sequential Procedure for Selecting the Most Probable Multinomial Event.
Technical rept.,
James T. Ramey, Jr., and Khursheed Alam. 21 Mar 78, 24p Rept nos. N95, TR-277
Contract N00014-75-C-0451

A sequential sampling procedure is given for selecting the most probable event from a multinomial distribution. Observations are taken sequentially until the largest count in any cell is equal to N or when the difference between the largest and the next largest cell count is equal to r, where r and N are given positive integers. Probability of a correct selection and expected sample number are given. (Author)

AD-A083 524/9 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
Estimation of Multinomial Probabilities.
Technical rept.,
Khursheed Alam. Nov 78, 18p Rept nos. N102, TR-294
Contract N00014-75-C-0451

This paper deals with the estimation of the parameters (cell probabilities) of a multinomial distribution. The maximum likelihood estimator (MLE) is known to be minimax and admissible with respect to a quadratic loss function. It is shown that the MLE is admissible with respect to a non-quadratic loss function. For the parameters of m multinomial distributions being estimated simultaneously and the loss being quadratic, an estimator is given which is shown to have smaller risk than the MLE for all but a small subset of the parameter space, when m is large. (Author)

AD-A083 525/6 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
Polarization Test for the Multinomial Distribution.
Technical rept.,
Khursheed Alam, and Amitava Mitra. Feb 79, 11p Rept nos. N105, TR-299
Contract N00014-75-C-0451

This paper gives a test of the hypothesis that the total probability associated with a multinomial distribution with k cells is evenly distributed among the k cells against the alternative hypothesis that it is less evenly distributed. (Author)

AD-A083 527/2 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
Estimation of the Non-Centrality Parameter of a Chi-Square Distribution.
Technical rept.,
K. M. Lal Saxena, and Khursheed Alam. Jan 80, 19p Rept nos. N112, TR-330
Contract N00014-75-C-0451

The non-central chi-square distribution arises in various statistical analyses. The estimation of the non-centrality parameter of the distribution is of importance in some problems. In this paper it is shown that the maximum likelihood estimator is inadmissible with respect to the squared error loss function. It is trivially minimax since all estimators have unbounded maximum risk. A class of estimators is given which are admissible and minimax for a modified loss function. (Author)

AD-A083 529/8 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
A Note on the Incomplete Beta Function.
Technical rept.,
Khursheed Alam. 25 May 79, 11p Rept nos. N107, TR-316
Contract N00014-75-C-0451

The incomplete beta function arises in various statistical problems. It is known, for example, that the tail probability of the binomial distribution can be expressed as an incomplete beta function. This paper gives some results on a monotonicity property of the incomplete beta function. The given results are shown to have application in a problem of ranking and selection. (Author)

AD-A083 530/6 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
Mahalanobis Distance as a Measure of Analog in Parametric Cost Estimation.
Technical rept.,
K. T. Wallenius. Sep 78, 18p Rept nos. N98, TR-322

Mahalanobis distance is suggested as a measure of analogy between a proposed system whose cost is to be predicted and a historical data base. It's role in the prediction problem and implications for selecting predictor variables is pointed out. (Author)

AD-A083 559/5 PC **A03**/MF **A01**
Naval Surface Weapons Center Dahlgren VA
Least-Squares Polynomial Fits to Gaussian Random Walk Segments,
Phillip L. Young, and Patrick J. Fell. Jan 80, 39p Rept no. NSWC/TR-79-300

This report addresses the least-squares (l.s.) polynomial approximation of gaussian random walk (r.w.) segments. The r.w.'s treated are assumed to be generated by the summation of zero mean, stationary, gaussian random sequences of real numbers. Expressions are developed that relate the statistics of these stationary underlying sequences to the statistics of the associated coefficients and residuals of fit of the approximating l.s. polynomials. When more than one segment of a given r.w. has been approximated, the statistical relationship between the residuals of the fits to the different segments is explicitly defined. Finally, an example using the main results is presented. It involves calculating the statistics of the fit residuals when the given r.w. is generated by the fractional frequency errors of an atomic clock. (Author)

AD-A083 614/8 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Stochastic and Adaptive Systems.
Final rept. 1 Feb 79-31 Jan 80,
Michael Athans, Sanjoy K. Mitter, and Lena Valavani. Mar 80, 19p LIDS-FR-981, AFOSR-TR-80-0304
Grant AFOSR-77-3281

This research is concerned with various aspects of stochastic and adaptive systems. Topics covered include: linear and non-linear state estimation, stochastic control and adaptive control.

N80-22009/8 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Asymptotic Eigenstructures.
P. M. Thompson. Apr 80, 36p NASA-CR-162625, LIDS-P-982
Contract NAG1-2

The behavior of the closed loop eigenstructures of a linear system with output feedback is analyzed as a single parameter multiplying the feedback gain is varied. An algorithm is presented that computes the asymptotically infinite eigenstructure, and it is shown how a system with high gain feedback decouples into single input, single output systems. Then a synthesis algorithm is presented which uses full state feedback to achieve a desired asymptotic eigenstructure.

N80-22016/3 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Multi-Level Adaptive Techniques (MLAT) for Singular-Perturbation Problems.
A. Brandt. 12 Oct 78, 91p NASA-TM-80966, ICASE-78-18
Contract NAS1-14101

The multilevel (multigrid) adaptive technique, a general strategy of solving continuous problems by cycling between coarser and finer levels of discretization is described. It provides very fast general solvers, together with adaptive, nearly optimal discretization schemes. In the process, boundary layers are automatically either resolved or skipped, depending on a control function which expresses the computational goal. The global error decreases exponentially as a function of the overall computational work, in a uniform rate independent of the magnitude of the singular-perturbation

terms. The key is high-order uniformly stable difference equations, and uniformly smoothing relaxation schemes.

N80-22017/1 PC **A07**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Numerical Methods for Large-Scale, Time-Dependent Partial Differential Equations.
E. Turkel. 20 Aug 79, 139p NASA-TM-80967, ICASE-79-20
Contract NAS1-14101

A survey of numerical methods for time dependent partial differential equations is presented. The emphasis is on practical applications to large scale problems. A discussion of new developments in high order methods and moving grids is given. The importance of boundary conditions is stressed for both internal and external flows. A description of implicit methods is presented including generalizations to multidimensions. Shocks, aerodynamics, meteorology, plasma physics and combustion applications are also briefly described.

PB80-169980 PC **A08**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Numerical Solution of Linear Difference Equations.
Final rept.,
Daniel W. Lozier. Mar 80, 170p NBSIR-80-1976

Consider a given inhomogeneous linear difference equation summation, s=0 to l (d sub s); (r)y(r+s) = g(r) where l = or > 2 and r = 0,1,2,... . Suppose y is a solution of this equation and u,v are solutions of the homogeneous form of this equation such that, as r approaches infinity, u(r)/v(r), y(r)/v(r), and u(r)/y(r) all approach 0. Under these circumstances algorithms for the computation of y based on forward or backward recurrence, such as the Miller algorithm, are numerically unstable. Stable algorithms, such as the method of Olver, have been based on approximating y(r) by the solutions of a certain sequence of boundary value problems. Boundary value problems of this type are shown to be equivalent to two initial value problems of order j and l-j by factorization of the difference operator. The solution of the problem of order j is obtained by forward recurrence; the solution of the other problem is obtained by backward recurrence. The algorithm is specified completely for a broad class of operators including, for example, every constant-coefficient operator. Convergence is proved and an expansion of the truncation error is derived. Numerical stability is demonstrated. The method is tested by numerical examples involving fourth-order equations with variable coefficients.

PB80-176225 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC.
Annotated Glossary of Selected Sampling Terms,
Earl E. Houseman. Jul 79, 17p

Important statistical terms commonly used in sample surveys are defined and discussed briefly. Definitions of such terms, as found in the literature on mathematical statistics, are often inadequate in practice. This glossary is more than concise definitions of terms. Explanations of important concepts associated with the terms are included with regard to practical conditions encountered in surveys.

PB80-180235 PC **A03**/MF **A01**
National Geodetic Survey, Rockville, MD.
Feasibility Study of the Conjugate Gradient Method for Solving Large Sparse Equation Sets.
Technical rept.,
Lothar Grundig. Feb 80, 27p NOAA-TR-NOS-82, NGS-13, NOAA-80032805

A feasibility study was performed to determine the effectiveness of various conjugate gradient methods for solving large sparse equation sets. Equations of this magnitude will be involved in the future new adjustment of the North American Datum. The conjugate gradient method provides a suitable algorithm for this purpose. Some typical nets associated with the new adjustment were used and compared with a direct solution algorithm. Results indicate that this method is well suited for constrained adjustments of triangulation networks, but not for free adjustments. No benefits were derived from preconditioning, which only increased the solution time.

PB80-184013 PC **A05**/MF **A01**
National Climatic Center, Asheville, NC.
A Note on a Gamma Distribution Computer Program.
Technical memo.,
Harold L. Crutcher, Danny C. Fulbright, and Grady F. McKay. Mar 80, 89p NOAA/TM/EDIS-28, NOAA-80041001

The gamma (Pearson Type III) distribution function may be used as a model for many types of data. The Fortran 4 program for this function: (1) provides the analytic solution to a set of data; (2) gives the probabilities of exceeding or not exceeding arbitrary amounts; (3) indicates the amounts exceeded or not exceeded for arbitrary probabilities; (4) provides options to use the biased or unbiased estimates of the maximum likelihood or Thom estimators or to use moment estimators; (5) provides options to provide confidence bands and intervals in tabular and/or graphical forms; and (6) provides for computer output to microfilm or drum and/or flatbed plotters.

12B. Operations Research

AD-A083 526/4 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
The Initial Busy Cycle of a Discrete-Time GI/G/1 Queue in which the Inter-Arrival Times are not Necessarily Identically Distributed.
Technical rept.,
Do Le Minh. Jun 79, 12p Rept nos. N110, TR-319
Contract N00014-75-C-0451

This paper studies a generalization of the discrete-time GI/G/1 queueing system. Here, the inter-arrival times are not necessarily identically distributed. A recursive scheme is derived to obtain the joint distribution of the duration of the initial busy period, the duration of the first idle period and the number of customers served during the initial busy period. (Author)

AD-A083 528/0 PC **A03**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
Analysis of the Single-Server Queue with Uniformly Limited Actual Waiting Times by the Use of Regenerative Processes and Analytical Methods.
Technical rept.,
Do Le Minh. May 79, 31p Rept nos. N106, TR-310
Contract N00014-75-C-0451

This paper studies the single-server queueing system in which no customer has to wait for a duration longer than a constant K. Using analytical method together with the property that the queueing process 'starts anew' probabilistically whenever an arriving customer initiates a busy period, we obtain various transient and stationary solutions for the system. (Author)

AD-A083 596/7 PC **A03**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Management Sciences Research Group
A Recursive Method for Solving Assignment Problems.
Management sciences research rept.,
Gerald L. Thompson. Oct 79, 45p Rept no. MSRR-448
Contracts N00014-76-C-0932, N00014-75-C-0621

The recursive algorithm is a polynomially bounded nonsimplex method for solving assignment problems. It begins by finding the optimum solution for a problem defined from the first row, then finding the optimum for a problem defined from rows one and two, etc., continuing until it solves the problem consisting of all the rows. It is thus a dimension expanding rather than an improvement method such as as the simplex. During the method the row duals are non-increasing and the column duals non-decreasing. Best and worst case behavior is analyzed. It is shown that some problems can be solved in one pass through the data, while others may require many passes. The number of zero shifts (comparable to degenerate pivots in the primal method) is shown to be at most n-squared/2. Extensive computational experience on the DEC-20 computer shows the method to be competitive for at least some kinds of assignment problems. Further tests on other computers are planned. (Author)

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A083 225/3 PC **A07**/MF **A01**
Marlow Industries Inc Garland TX
High Efficiency, Low Power Thermoelectric Coolers.
Final rept.
1979. 129p
Contract DAAK70-78-C-0016

This report describes the work performed on a 15 month development program. The purpose of this program was the development of a high performance, multi-stage thermoelectric (TE) cooler which would operate satisfactorily under extreme military environments. Five coolers each of three types (various heat loads), were designed and fabricated. Detailed environmental and performance tests were performed on these coolers. The electrical tests included measurement of COP/stage and performance under various heat loads on each type of cooler. The effect of adding radiation shielding to each type was also determined. All of the coolers performed satisfactorily after environmental and performance testing. Performance data, predicted from design calculations and computerized material parameter measurements, showed excellent correlation with measured test data. A TE material development and evaluation program was conducted in conjunction with the cooler design and fabrication effort. P-type TE material was produced which was comparable to that commercially available. Advanced computerized TE material evaluation techniques developed by Marlow Industries were used to evaluate alpha, rho, Kappa, and Z for a particular lot of material toward the end of the program. (Author)

AD-A083 361/6 PC **A10**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Sanitary Norms of the Design of Industrial Enterprises. SN 245-71.
9 Jul 79, 218p Rept no. FTD-ID(RS)T-0694-79
Unedited machine trans. of mono. Sanitarnyye Normy Proyektirovaniya Promyshlennykh Predpriyatiy SN 245-71, Moscow, 1972 p1-97.

No abstract available.

AECL-5963 PC **A05**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Feasibility of Agricultural Uses of Thermal Effluent from Glace Bay Heavy Water Plant.
S. L. Iverson, V. R. Puttagunta, K. D. Meek, and K. L. Chisholm. Apr 78, 94p
U.S. Sales Only.

The costs and practicality of pumping effluent water from the GBHWP outfall channel about 500 m to a distribution point, distributing it to up to 25 acres of greenhouses, transferring the heat to the greenhouse air, returning the water to the effluent channel and providing a back-up heat supply were examined. The system described will not interfere with GBHWP operations and can provide a good environment for plant growth at a very attractive price. If a system was designed to serve a 5-acre greenhouse industry, it would cost $18 280 to heat each acre of greenhouse per year ($1.76/GJ), while a system servicing 25 acres could heat greenhouses for only $11 824 per acre per year ($1.14/GJ). This can be compared with the average of $20 000 per acre for fuel alone, paid by Nova Scotia growers in 1975, or the $25 000 per acre per year ($2.40/GJ) calculated in this study as the cost for Bunker C fuel alone at July 1977

prices. The low heating costs possible using waste heat should allow a viable greenhouse industry to be established at Glace Bay, Nova Scotia, and it is recommended that a demonstration greenhouse be constructed to verify the results of this study and demonstrate the technology to potential growers. (Atomindex citation 10:427486)

ANL/CNSV-TM-24 PC **A10**/MF **A01**
Franklin Research Center, Philadelphia, PA.
Heat-Pump-Centered Integrated Community Energy Systems. Final Report.
R. E. Crane, and R. G. Werden. Dec 79, 223p
Contract W-31-109-ENG-38

Heat-pump-centered integrated community energy systems (HP-ICES) are energy systems for communities which provide heating, cooling and/or other thermal energy services through the use of heat pumps. Since heat pumps primarily transfer energy from existing and otherwise probably unused sources, rather than convert it from electrical or chemical to thermal form, HP-ICES offer significant potential for energy savings. By powering these heat pumps with nonscarce fuels, the use of which would be impractical in most conventional systems, less-abundant fuels including natural gas and oil can be conserved. Secondary benefits of HP-ICES include reduction of adverse environmental effects as compared to conventional systems, reliable production of services in contrast to the increasingly frequent utility curtailments and interruptions, and delivery of services to consumers at costs lower than those for conventional systems (including acquisition, operation, and maintenance costs). The objective of this multiphase HP-ICES project is development and demonstration of concepts leading to one or more operational systems by the end of 1984. The findings from the System Development Phase of the program are reported. Information is included on the HP-ICES concept; its application potential; variations in the basic HP-ICES concept which could lead to improved performance; applications of the concept to specific communities; design; economics; environmental impacts; and component testing requirements. (ERA citation 05:013813)

ANL/MSD/FE-80-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Development of Nondestructive Evaluation Techniques for High-Temperature Ceramic Heat Exchanger Components. Ninth Quarterly Report, October-December 1979.
Jan 80, 25p
Contract W-31-109-ENG-38

Progress in developing and evaluating nondestructive methods for testing ceramic components for high-temperature heat exchangers is reported. The sensitivity of the ultrasonic bore-side probe was demonstrated for detection of 125- mu m-deep circumferential EDM notches on ID and OD surfaces of sintered and siliconized tubes. The signal to noise ratios for the ultrasonic echoes are better than 10 to 1, beyond the initial expectations for detection of small reflectors. This results from focussing of the beam in the tube wall. Preliminary data were presented on microprocessor-controlled operation of the ultrasonic probe. Some problems involving the computer interfacing have to be resolved, but detection and recording of an EDM notch located was demonstrated. The acoustic microscope was modified to handle 30-MHz sound waves. This was done to improve the penetration ability of the sound in SiC tube walls. The modification results in less acoustic noise. The ability to detect a notch only 75 mu m in width was demonstrated. (ERA citation 05:014006)

BDX-613-2350 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Heat Pipe Cooling of an Aerospace Foam Mold Manufacturing Process.
D. R. Hahn, K. T. Feldman, and P. L. Marjon. 1980, 7p CONF-800104-4
Contract EY-76-C-04-0613
18. AIAA aerospace sciences meeting, Pasadena, CA, USA, 14 Jan 1980.

A passive heat pipe cooling system was developed to cool a Bendix foam mold used to manufacture aerospace foam parts. The cooling system consists of ten copper-water heat pipes with cooling fins implanted into the aluminum mold and cooled by a domestic size fan blowing ambient air. The number and location of the heat pipes was determined to provide the most effective cooling and mold isothermalization based on experimental measurements of mold temperatures during the exothermic foaming process and from practical considerations of the mold geometry and use. Performance tests were cnducted on an individual heat pipe and on the ten heat pipes implanted in the mold. Both exothermic foam heating and internal electrical heat input were used in the experiments. The experimental test results indicate that the heat pipe cooling system with a fan is four to six times faster than free convection cooling of the mold with no heat pipes or fan and nearly twice as fast as cooling by the fan only. Similarly fast increases in mold heating time in the cure furnace could be realized if the heat pipes are used during this part of the production process. The heat pipes also cool hot spots in the mold and help isothermalize the mold so that better quality foam parts should be produced. (ERA citation 05:016285)

BNL-27012 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Series Solar Heat Pump and Energy Conservation.
E. A. Kush. 1979, 24p CONF-791204-13
Contract EY-76-C-02-0016
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

An overview is given of the series solar heat pump concepts and the reasons why it can serve an important role in energy conservation in space heating. These are highlighted by elevated Coefficients of Performance (COP's) and the use of low-temperature potentially inexpensive solar collectors. The characteristics required of the subsystems and integrated system are detailed. Particular emphasis is given to the performance of the heat pump itself at high temperature source conditions corresponding to those of solar input, and recent laboratory results which demonstrate very high COP's using practical components are shown. The reasons why the high COP's are a necessary but not sufficient condition for competitive overall system performance are detailed and methods for applying the high COP's to an effective Solar Assisted Heat Pump (SAHP) system are discussed. Ongoing development work in the field is summarized. (ERA citation 05:011647)

BNL-27137 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Experimental Results from the First Year of Operation of the Solar Ground Coupling Research Facility at Brookhaven National Laboratory.
P. D. Meta. 1979, 14p CONF-791204-19
Contract EY-76-C-02-0016
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

Results from the first year of operation of the solar ground coupling research facility at Brookhaven National Laboratory (BNL) are presented. Nine experiments which are first generation ground coupled heat transfer and storage devices for a solar source heat pump system have been operated since December 1978. A computer program called GROCS which models the heat transfer between these devices and the earth has been written (and subsequently integrated with the solar energy system simulation program TRNSYS by John W. Andrews). In this paper the ground coupling research program, the first generation experiments, and the underground heat flow model GROCS are described. Experimental results from December 1978 to September 1979 are presented and compared to model directions. (ERA citation 05:013346)

BNL-51067 PC **A09**/MF **A01**
Battelle Columbus Labs., OH.
Survey of Available Technology for the Improvement of Gas-Fired Residential Heating Equipment. Final Report.
A. A. Putnam, S. G. Talbert, R. D. Vergara, A. Levy, and D. W. DeWerth. Aug 79, 198p
Contract EY-76-C-02-0016

Available technology was surveyed as to possible application to more efficient gas-fired comfort heating and water heating in residences. Objectives were (1) to evaluate energy saving modifications and design approaches, including both retrofit and new systems, and (2) to identify RD and D required to bring to the marketplace those concepts that have a reasonable payback period. Over 60 concepts, including both retrofit devices and new designs, were identified on the basis of the study of the technical literature and discussions with various segments of industry. After evaluating each concept on the basis of expected initial cost, energy consumption, and operating cost, those concepts with a reasonably short payback period were considered from the point of view of RD and D needs. A principal recommendation covering several specific concepts was the study of condensing heat-exchanger systems. RD and D was recommended on both mechanical and aerodynamically valved pulse combustors, radiant burners, catalytic systems, heat pipe systems, self-powered heating units, and gas-fired heat pumps. Relative to retrofit concepts, recommendations covered the effects of derating on furnace corrosion and the methodology for predicting savings in individual homes. Need was also indicated for a methodology to optimize sizing of heating units and for data on energy demand requirements for integrated appliances. General recommendations related to systems control analysis, minimum venting requirements, and combustion air requirements in tight homes. (ERA citation 05:013744)

CONF-791105-3 PC **A02**/MF **A01**
Mohawk Coll., Hamilton (Ontario).
Prediction of Calcium Carbonate Scaling from Water in Solar-Energy Systems.
I. Singh, C. F. Cheng, and P. S. Chopra. 27 Nov 79, 6p
Contract W-31-109-ENG-38
Annual solar heating and cooling systems operational results conference, Colorado Springs, CO, USA, 27 Nov 1979.

Water samples collected from subsystems at five Department of Energy-sponsored solar-energy sites were assessed for chemical scaling deposition. Collector surfaces are the most likely area for scale formation, and the deposits are most likely to be calcium carbonate. Various techniques that solar designers and operators can employ to predict scaling on heat-transfer surfaces and to determine whether water treatment is required to prevent it are described. (ERA citation 05:015427)

CONF-791236-1 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Environment.
Industrial Boiler New Source Performance Standard: A DOE Perspective.
D. Carter, and D. G. Streets. 1979, 9p
Contract W-31-109-ENG-38
Industrial boilers conference, Raleigh, NC, USA, 10 Dec 1979.

The major concerns identified by DOE regarding the INSPS now under development by the US EPA are presented. DOE's principal areas of concern include: direct impact on coal use; impact on emerging energy technologies; impact on energy efficient fuel systems (e.g., cogeneration); impact on the environment; and industry or region-specific impacts. Future activities DOE expects to pursue are listed. (ERA citation 05:016333)

CONF-800206-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Analytical and Experimental Study of Heat-Pump Losses Due to Frosting, Defrosting, and Cycling. Proposed ASHRAE Research Project.
F. A. Creswick. 1980, 5p
Contract W-7405-ENG-26
American Society of Heating, Refrigeration, and Air Conditioning Engineers semi-annual meeting, Los Angeles, CA, USA, 3 Feb 1980.

A proposal for an analytical and experimental study of heat pump losses during frosting, defrosting, and cycling is presented. (ERA citation 05:015985)

COO-2868-5 PC **A08**/MF **A01**
Colorado State Univ., Fort Collins. Solar Energy Applications Lab.

Performance Evaluation of a Solar Air-Heating and Nocturnal Cooling System in CSU Solar House II. Final Report, June 1, 1977-September 30, 1978.
S. Karaki. Apr 79, 173p
Contract EY-76-S-02-2868

The solar heating system in Solar House II consists of 67.1 m exp 2 of double-glazed air-heating collectors with flat-black absorbers, 10.3 m exp 3 of pebble bed storage, air-to-water heat exchanger for preheating domestic water and one blower to circulate the air through the system. The nocturnal cooling system consists of an evaporative cooler and utilizes the pebble bed for cool storage. A schematic diagram of the system is shown. (ERA citation 05:013349)

COO-30122-3 PC **A03**/MF **A01**
Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
CSU Solar House III. Solar Heating and Cooling System Performance. Progress Report, 1 October 1978-31 May 1979.
D. S. Ward, and H. S. Oberoi. Aug 79, 47p
Contract AC02-79-CS-30122

During the period 1 October 1978 through 31 March 1979, the Chamberlain liquid-heating state-of-the-art flat-plate solar collector was evaluated for a complete heating season. The data acquisition and analysis was a continuation of the cooling season performance evaluation conducted during the summer and fall of 1978. Significant and important results of the systems evaluation include: (1) The demonstration of the critical importance of temperature differentials between the collector outlet and the absorption chiller generator inlet, the effects of alternative control strategies, the marginal feasibility of cool storage, the devastating effect on system performance due to heat losses from the thermal storage unit, and the importance of minimizing electrical parasitic power requirements in obtaining feasibility for solar absorption cooling systems. (2) The concept of overall system efficiency was shown to be essential in the determination of the feasibility of any solar installation. (3) Evaluation of acquired data on the performance of the CSU Solar House III system has provided the theoretical construction and experimental verification of the importance of solar operating threshold (i.e., the minimum solar radiation intensity at which the collector can collect useful solar heat). (ERA citation 05:013351)

COO-4154-4 PC **A04**/MF **A01**
Davis Alternative Technology Associates, CA.
Suncatcher Monitoring Project. Final Report, September 1, 1977-December 31, 1978.
B. T. Maeda, P. W. Grant, and R. D. Anson. Aug 79, 69p
Contract EG-77-G-04-4154

The Suncatcher Monitoring Project has to date accumulated a wide variety of data on the Nittler/Maeda Suncatcher house in Davis, California, designed by Living Systems. Highlights of the data indicate 70% solar heating during 1978 despite unusually adverse winter weather conditons and a 40% increase of solar energy in winter through clerestory glazing as compared to ordinary south glazing. The data acquisition system (DAS) only worked intermittently during 1978, but hourly data was gathered during several intervals and daily data was virtually continuous. As a back-up to this hourly gathering of data hand read data was taken daily from September 1977 to the present. This manually collected data has allowed a reliable estimate of the Suncatcher house's performance. Summer data on Suncatcher window performance has been collected for comparison purposes, but budget constraints have delayed completion of computer modeling of the Suncatcher performance. Comparison of the overall Suncatcher's performance with the estimation models, SOLEST and LASL6, and simulation model, SOLSIM, appear accurate, although completion of the reflector enhancement algorithm remains desirable. (ERA citation 05:015371)

COO-4531-8 PC **A04**/MF **A01**
Illinois Inst. of Tech., Chicago.
Beneficial Use of Waste Heat in Municipal Water Supply. Technical Report TR-79-3.
R. W. Porter. Aug 79, 56p
Contract EC-77-S-02-4531

The relatively low temperature of thermal discharges from steam-electric power plants makes waste-heat utilization difficult without modification of the power cycle and attendant reduction in electrical energy generated. In situ beneficial use of waste heat by direct once-through condenser discharge into a municipal water supply is discussed. Computations are presented regarding the matching of flow rates, heat losses in distribution and energy savings. A number of benefits and penalties are also assessed qualitatively including legal and operational aspects and reliability. Especially attractive are improvements in electrical generating efficiency, and savings in water-heater energy. Secondary advantages include alleviation of pipe freeze up in winter and improved efficiency of slightly heated waste-water treatment. Penalties include additional pumping power for distribution in the water supply due to increased back pressure on the steam turbines which employ condensers cooled by the water they pump. Additional chlorine is also required to maintain a residual concentration in the distribution system. There may also be difficulties with public acceptance of water preheated by up to about 24 exp 0 F, especially in summer. The water supply of greater Chicago and 4880 MW(e) of colocated fossil-fired load-following generating capacity were analyzed as a hypothetical test case. It was concluded that the net annual energy savings is 23 x 10 exp 12 B, equivalent to 4 million bbl of oil, with a net savings in cost of $12./capita for the population of 4.66 m. While not developed for energy conservation purposes, three actual systems with operating experience are summarized. In order to determine feasibility of application, site-specific systems analysis is required. (ERA citation 05:016099)

COO-4664-1 PC **A02**/MF **A01**
Solar Systems of Virginia, Inc., Hampton.
Cost Effective Solar Hot Water System for Econo-Travel Motor Hotel Located at Richmond, Virginia. Final Report.
Sep 79, 17p
Contract EM-78-G-02-4664

The final report is presented of a cost effective solar hot water heating system installed on the Econo-Travel Motor Hotel at 5408 Williamsburg Road, Richmond, Virginia. The description of the system is given along with the final cost breakdown, expected performance data and expected payback time for the installed system is estimated to be approximately five (5) years instead of the 6.65 years estimated for the proposal. The additional savings is due to the reduction in the peak demand charge since the electric hot water heaters are not required to operate at the same time each morning as the dryers used for the laundry. The success of the system will be determined by the reduction in the utility cost and reduced use of our fossil fuels. The results shown in the hotel's monthly electricity bills indicate that this goal has been accomplished. (ERA citation 05:013371)

COO-4665-1 PC **A02**/MF **A01**
Solar Systems of Virginia, Inc., Hampton.
Cost Effective Solar Hot Water System for Econo-Travel Motor Hotel Located at Bluefield, West Virginia. Final Report.
Jul 79, 16p
Contract EM-78-G-02-4665

The final report of a cost effective solar hot water heating system installed on the Econo-Travel Motor Hotel at 3400 Cumberland Road, Bluefield, West Virginia. The description of the system along with the final breakdown performance data and payback time are given. The payback time for the installed system will be approximately five (5) years instead of the 7.73 years estimated for the proposal. The additional savings is due to the reduction in the peak demand charge since the electric hot water heaters are not required to operate at the same time each morning as the dryers used for the laundry. The success of the system will be determined by the reduction in the utility cost and reduced use of our fossil fuels. The results shown in the hotel's monthly electricity bills indicate that this goal has been accomplished. (ERA citation 05:013372)

COO-4979-1(V.1) PC **A02**/MF **A01**
Toledo Edison Co., OH.
District Heating and Cooling Systems for Communities Through Power Plant Retrofit and Distribution Network. Volume 1. Executive Summary. Final Report.
J. R. Watt, and G. A. Sommerfield. Aug 79, 16p
Contract EM-78-C-02-4979

The potential service area for a district-heating system includes the existing downtown Toledo steam system and nine new customers. An alternative extends the system about ten city blocks to a large hospital now fueled with oil. The annual peak demands are estimated at 278.6 and 325.8 million Btu/hr., respectively. Retrofit schemes are similar for both service areas. A back-pressure turbine added in parallel with Toledo Edison's Acme Station No. 2 turbine would provide steam at 250 psig. The plant's electrical output would decrease 18 and 23 MW for the two plans. Scarce fuel saved is estimated at 5.2 and 6.0 million gallons of No. 6 oil, respectively. Although no insurmountable barriers were apparent, the success of such a system is not guaranteed. Large base-load users must make long-term commitments to support the establishment of a system. Drawbacks to successful implementation include lack of incentive for potential customers to connect to the system due to an apparent abundant supply of natural gas; difficulty in financing due to the higher risk involved; reluctance of utility production services to narrow reserve margins caused by steam extraction; and the future uncertainties about environmental constraints on electric power plants. (ERA citation 05:013816)

DOE/CS-0115 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Weighting Factors. Technical Support Document for Notice of Proposed Rulemaking on Energy Performance Standards for New Buildings.
Nov 79, 23p

It is DOE's decision that both Design Energy Consumption and Design Energy Budget be calculated as weighted sums of the quantities of the various fuel components of the building design energy requirements. Three alternatives have been suggested for determining the weights: (1) the use of Energy Budget Levels expressed in terms of the energy content of the fuel delivered to the building site, with all weights set equal to one (equivalent to veiwing design energy from the perspective of the building boundary); (2) the use of Resource Utilization Factors (RUF's) and Resource Impact Factors (RIF's) to reflect, respectively, the energy consumption to the Nation of providing energy to a building site, starting at the energy source, and the social impacts of using different fuel types; and (3) weighting factors based on the relative value of the different fuels to the Nation, expressed in terms of (1) fuel prices, and (2) explicit national policy determinations of nonmarket values associated with specific fuel types. The document explores the issues, advantages and disadvantages associated with each alternative. Further, it explains DOE's decision and choice of weighting factors. The different weighting options are considered in terms of impact on total US energy consumption, thermodynamic efficiencies, market prices, the nonmarket or social costs of various fuels, and the relative values of different fuels to the Nation. (ERA citation 05:012073)

DOE/CS-0118 PC **A05**/MF **A01**
Department of Energy, Washington, DC.
Proposed Energy-Performance Standards for New Buildings: Standard Building Operating Conditions. Technical Support Document.
Nov 79, 79p

The process of developing Energy Budget Levels for new commercial buildings, in conjunction with the energy-performance standards for new buildings, includes the use of energy-analysis computer programs. These programs are used to estimate the design energy requirements of randomly selected commercial buildings comprising the study sample in both the Phase I and Phase 2 studies conducted by the American Institute of Architects Research Corporation. The input to these programs includes a set of data known as the Standard Building Operating Conditions (SBOC). These SBOC consist of temperatures, human-occupancy densities and profiles, lighting-usage profiles, and

the like. They describe typical conditions under which a commercial or multifamily residential building would operate during the course of a day. This report (a) describes which building operating conditions were standardized, and how this was done in the AIA/RC team research efforts in Phases 1 and 2, which developed an information base for use by DOE in the development of the standards; (b) discusses alternative ways that SBOC may be applied in a regulatory compliance context, and the advantages and disadvantages of each alternative; (c) examines some of the implications of the standardization of operating conditions; and (d) provides, for use with the Standard Evaluation Technique, SBOC that are reasonable, based on the research conducted, and that provides an equitable basis for comparing annual Design Energy Consumption estimates of buildings against Design Energy Budgets. (ERA citation 05:010241)

DOE/CS-0120 PC **A15**/MF **A01**
Department of Energy, Washington, DC.
Proposed Energy-Performance Standards for New Buildings: The Standard Evaluation Technique. Technical Support Document.
Nov 79, 337p

An evaluation technique is a requirement of Pub. L. 94-385, which mandated the development of the standards. It is used to determine if the Design Energy Consumption (DEC) of a new building design is not greater than the Design Energy Budget (DEB), as determined from the proposed rule. While such an evaluation technique could be used for purposes other than demonstrating a building design's compliance with the DEB's, the discussion here is limited to this particular application. In general, the evaluation technique for the proposed standards is composed of 3 major elements: an energy calculation method, fixed parameters which establish a consistent basis for comparing the DEC of a building design to its DEB; and procedures for the combined use of both the calculation method and the fixed parameters. The application of the evaluation technique to specific building classifications which incorporate a wide variety of architectural features, heating, ventilating, and air-conditioning (HVAC) systems, as well as domestic hot water heating systems, which use nonrenewable and some renewable energy sources is defined. The selection process leading to DOE's choice of computer simulation programs for the Standard Evaluation Technique is discussed. (ERA citation 05:010242)

DOE/CS/4048-2 PC **A03**/MF **A01**
Bell Telephone Co. of Pennsylvania, Philadelphia.
West Chester Work Center: Solar Space Heating Demonstration Project.
May 79, 47p COO-4048-2
Contract EY-76-C-02-4048

This document reports on the construction stage of a solar space heating demonstration project. It describes an integrated system providing solar energy space heating for a 9982 sq. ft., newly built, one-story building. The building is located at 966 Matlack Street, West Goshen Township, Chester County, Pennsylvania. Functionally, the building consists of two sections: An Office and a Storeroom. The Office section is heated by solar-assisted water-to-air heat pump units. The Storeroom section is heated by an air-handling unit, containing a water-to-air coil. Solar energy is expected to provide 62% of the heating load, with the balance provided by a back-up electric boiler. The system includes 1900 active (2112 gross) square feet of flat-plate solar collectors, and a 6000 gallon above-ground indoor storage tank. Freeze protection is provided by a gravity drain-down scheme combined with nitrogen pressurization in a closed circuit. (ERA citation 05:013352)

DOE/CS/4131-1(V.2) PC **A17**/MF **A01**
Alabama Univ. in Huntsville. Kenneth E. Johnson Environmental and Energy Center.
Final Proceedings of the Second Solar Heating and Cooling Commercial Demonstration Program Contractors' Review. Volume 2. Orally Presented Papers.
D. B. Cagle. Jul 79, 397p CONF-781220-(V.2)
Contract EC-78-C-01-4131
Second solar heating and cooling commercial demonstration program contractor's review, San Diego, CA, USA, 13 Dec 1978.

Separate abstracts were prepared for the 44 papers presented. (ERA citation 05:009905)

DOE/ET/40291-1 PC **A03**/MF **A01**
Environmental Data Corp., Monrovia, CA.
Demonstration of the Environmental Data Corporation Spectral Fuel Conservation System Program Plan.
15 Nov 79, 42p
Contract AC02-79CS40291

The purpose of this program is to demonstrate and quantify the amount of fuel that can be saved if the Spectral Fuel Conservation System (SFCS) developed by the Environmental Data Corporation (EDC) is installed in coal-fired industrial boilers. Of central importance to the program are the selection of an appropriate test site and the preparation and methodical application of a comprehensive test strategy. Consequently, the sections dealing with these topics in the proposal have been considerably expanded in this program plan to include as much preparatory thinking as is possible at this early stage. The remainder of this document is essentially an update version of the technical portion of the proposal. No change in the schedule is anticipated. (ERA citation 05:013505)

DOE/ET/40291-2 PC **A02**/MF **A01**
Environmental Data Corp., Monrovia, CA.
Demonstration of the Environmental Data Corporation Spectral Fuel Conservation System. Quarterly Report, October-December, 1979.
18 Jan 80, 12p
Contract AC02-79CS40291

A program plan was prepared and submitted to the Department of Energy in November 1979. The criteria that must be satisfied by the host site for a successful demonstration of the Spectral Fuel Conservation System have been developed and are included in this report. The process of demonstration site selection is underway and is expected to be completed on schedule by March 31, 1980. Preliminary discussions with Union Carbide indicate that the coal-fired boilers at the company's specialty chemicals plant in Institute, West Virginia appear to satisfy all the major site criteria. Exchanges of drawings are now in progress for further evaluation prior to undertaking a site inspection visit. Finally, a literature search has been initiated to determine the distribution by size and type of coal-fired boilers in the industrial sector as background to the energy savings analysis required in Task 11. (ERA citation 05:013506)

DOE/NASA/CR-161340 PC **A03**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Prototype Solar Heating and Combined Heating and Cooling Systems. Quarterly Report No. 9.
2 Oct 78, 45p
Contract EX-76-A-29-1037

Eight prototype solar heating and combined heating and cooling systems are under development. This effort includes development, manufacture, test, installation, maintenance, problem resolution, and performance evaluation. (ERA citation 05:013353)

DSE-4042-T15 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Energy for Agricultural and Industrial Process Heat.
22 Jun 79, 30p
Contract EG-77-C-01-4042

A state-of-the-art review of solar process heat is given; near term prospects are discussed; and the federal solar industrial process heat program is reviewed. Existing solar industrial process heat projects are tabulated. (ERA citation 05:011676)

FE-2583-EXT-1-T1 PC **A02**/MF **A01**
Institute of Gas Technology, Chicago, IL.
L-Valve Multiport Feed System. Interim Report for Task 10120, Limestone Test.
T. M. Knowlton. 12p
Contract EF-77-C-01-2583

An investigation was undertaken to determine the feasibility of using an L-valve to control the flow rate of both wet and dry limestone. The results of this investigation indicate that the L-valve tested can feed dry 1/8-inch x 0 limestone extremely well; feed wet 1/8-inch x 0 limestone well at flow rates above 1000 lb/h; and feed 8000 lb/h of wet limestone using only 15 actual CFM of nitrogen and 8000 lb/h of dry limestone using only 12.5 actual CFM of nitrogen. (ERA citation 05:015685)

LA-UR-80-246 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Control System Analysis for off-Peak Auxiliary Heating of Passive Solar Systems.
H. S. Murray, J. L. Melsa, and J. D. Balcomb.
1980, 5p CONF-800101-7
Contract W-7405-ENG-36
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

A computer simulation method is presented for the design of an electrical auxiliary energy system for passive solar heated structures. The system consists of electrical mats buried in the ground underneath the structure. Energy is stored in the ground during utility off-peak hours and released passively to the heated enclosure. An optimal control strategy is used to determine the system design parameters of depth of mat placement and minimum instaled electrical heating capacity. The optimal control applies combinations of fixed duration energy pulses to the heater, which minimize the room temperature error-squared for each day, assuming advance knowledge of the day's weather. Various realizable control schemes are investigated in an attempt to find a system that approaches the performance of the optimal control system. (ERA citation 05:013354)

LA-UR-80-248 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Thermal and Cost Goal Analysis for Passive Solar Heating Designs.
S. A. Noll, and C. Kirschner. 1980, 6p CONF-800101-8
Contract W-7405-ENG-36
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

Economic methodologies developed over the past several years for the design of residential solar systems have been based on life cycle cost (LCC) minimization. Because of uncertainties involving future economic conditions and the varied decision making processes of home designers, builders, and owners, LCC design approaches are not always appropriate. To deal with some of the constraints that enter the design process, and to narrow the number of variables to those that do not depend on future economic conditions, a simplified thermal and cost goal approach for passive designs is presented. Arithmetic and graphical approaches are presented with examples given for each. Goals discussed include simple payback, solar savings fraction, collection area, maximum allowable construction budget, variable cost goals, and Btu savings. (ERA citation 05:013355)

LA-8134 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Magnetic Refrigeration for Space Applications: Report on a Design Study.
J. A. Barclay, and W. A. Steyert. Feb 80, 25p
Contract W-7405-ENG-36

Results of a preliminary design study of magnetic refrigerators for space applications are summarized. Three items are discussed: (1) a design for a 5-W, 4 K to 20 K magnetic-wheel refrigerator; (2) a theoretical evaluation of a new device, called a regenerative-magnetic expander, that operates between 3.8 K and 20 K; and (3) an active magnetic regenerator that provides refrigeration at 4 K and expels heat at 200 K. (ERA citation 05:016291)

LBL-10360 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Predicting the Time Response of a Building under Heat Input Conditions for Active Solar Heating Systems.
M. L. Warren, A. F. Sakkal, and S. R. Schiller.
Jan 80, 19p CONF-800101-12
Contract W-7405-ENG-48
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

A dynamic model has been developed to determine the response of a residential building to

changes in heat input, and to predict room and air temperature changes. The model has been developed to simulate the response of a typical building for possible use with the LBL test facility that evaluates control strategies for active solar systems. The model must properly predict the rapid rise in room temperature resulting from addition of heat with a fan coil, must give the correct average building load, and must require only limited computational capabilities. The building is modeled as a three node capacitance-resistance network which can be solved to determine the room air temperature, interior wall temperature, and building-shell wall temperature as a function of time in response to heat input. Capacitance terms represent the thermal masses of the air within the structure, the interior walls, and the interior surface of the outer building shell. Resistance terms represent the resistance to the heat transfer from the interior and exterior walls to the room air, from the exterior wall to the outside, and from the room air to the outside by transmittance through windows and by infiltration. The heat input is provided directly to the air (as, for example, when a heating fan coil is turned on). The time dependent equations are solved using Laplace transforms to determine the building response to a step increase in heat input power. The dynamic response of the building's temperatures can be characterized in terms of the building heat loss coefficient, UA, and three exponential decay terms with appropriate time constants and weights. (ERA citation 05:015384)

LBL-8913 PC **A03**/MF **A01**
RLI Byggdata AB, Saltsjobaeden (Sweden).
Storage of Heat and Coolth in Hollow-Core Concrete Slabs. Swedish Experience, and Application to Large, American-Style Buildings.
L. O. Anderson, K. G. Bernander, E. Isfaelt, and A. H. Rosenfeld. 26 Oct 79, 28p CONF-791009-25
Contract W-7405-ENG-48
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.

The Folksam office building in Farsta, near Stockholm, has operated since December 1977 with an energy use for direct space heating of only 60 kWh/m exp 2 (19,000 Btu/ft exp 2), which is only half the Stockholm average for new buildings. To this 60 kWh/m exp 2 must be added the typical electric use of another 60 kWh/m exp 2 for lights, equipment, fans, etc. Even though Stockholm has 3580 deg-day (C), new Swedish buildings are so well insulated that their temperature floats upwards during most winter working days. In the Folksam building, this surplus heat from 40 full-occupied hours per week is stored in hollow-core concrete slabs, and then is used to compensate for the heat losses during the remaining 128 unoccupied hours. The energy transport/storage system necessary to keep the indoor temperature comfortable, summer and winter, is called Thermodeck, and is described in detail. (ERA citation 05:012096)

LBL-9294 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Passive Solar Design Process for a Small Office/Laboratory Building.
B. Andersson, R. Kammerud, and W. Place. Oct 79, 15p CONF-791009-26
Contract W-7405-ENG-48
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.

In order to assess the compatibility of existing passive solar design tools with the architectural process, a case study design for a small commercial building has been performed. The architectural process employed in the design is presented, the areas within the process for which appropriate tools are not immediately available are identified, and some improved tools are proposed. The potential advantages of passive solar design for a small commercial building in an adverse climate are demonstrated. (ERA citation 05:013357)

LBL-9371 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Design Calculations for Passive Solar Buildings by a Programmable Hand Calculator.
D. B. Goldstein, M. Lokmanhekim, and R. D. Clear. Aug 79, 81p CONF-7908103-1
Contract W-7405-ENG-48
Izmir International symposium-II on solar energy fundamentals and applications, Izmir, Turkey, 6 Aug 1979.

The behavior of room temperature in a passive solar building without backup heat is of great interest to the building designer. Programs are presented for card-reading programmable hand-calculators which compute room temperature over the course of a design day. Instructions for calculating the input parameters, and for running the programs are given, and a brief review of the theory is provided. The program can presently be used only for single-zone unmanaged, direct-gain buildings. (ERA citation 05:013358)

LBL-9787 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Simple Method for Computing the Dynamic Response of Passive Solar Buildings to Design Weather Conditions.
D. B. Goldstein, and M. Lokmanhekim. Sep 79, 13p CONF-791204-16
Contract W-7405-ENG-48
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

In contrast to the length computations required to simulate hour-by-hour building performance using response-factor or thermal network models, design-day performance can be analyzed simply by using a method developed based on Fourier transforms. This paper describes how Fourier response functions are derived from the building's thermal properties and shows how approximations can be made which allow the results to be expressed as algebraic formulas which can be computed rapidly using a hand-calculator. A program written for a hand-calculator which can perform this analysis requires as inputs building design parameters such as UA products (conductances), specific heats of materials, and weather parameters. Since similar materials (e.g. frame walls and ceilings) can be lumped together, data for only a few different construction types are needed. Weather parameters are: daily solar gains for sunny and cloudy design days, length of cloudy design weather cycle, average ambient temperature of the design day and typical diurnal temperature fluctuation. Output from the program is hourly room temperatures for each of the design days. (ERA citation 05:011656)

N78-77775/2 PC **A13**/MF **A01**
AiResearch Mfg. Co. of California, Torrance.
The 75 Degree K Miniature Vuilleumier Cryogenic Engine. Task 1: Preliminary Design.
Final rept.,
D. K. Yoshikawa. Oct 70, 293p 70-6854, NASA-CR-156773

The report describes the Task I (Preliminary Design) phase of the VM cryogenic refrigerator design, development, and fabrication program. The general requirement of the refrigerator is to produce 5 watts of cooling at 75 K after operating 2 to 5 years in a space environment. These Task I accomplishments provide the basis for the further design, analysis, development testing, and evaluation to be conducted during the next phase (Task II) of this program.

N80-21715/1 PC **A06**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Technical Assistance for the Evaluation of Fluid Loops-Component (Peltier Cooler). Phase 1: Report.
R. Best, U. Hingst, H. Kreeb, and W. Mueller. 1979, 117p ESA-CR(P)-1246
Contract ESTEC-3774/78-NL-PP

The refrigerator-heat pump effect for commercially available Peltier Element coolers (PE) integrated in a cooling system was investigated. Possible temperature stabilization of one side of the cooler and the necessary power supplies and power consumption for a given temperature range and heat load were studied, along with mounting and integration problems. Performance data of bare PE's are degraded if the main input parameters are based on the heat sink and source plate and the heat flux from the source plate. The main limitations on the applicaton of PE's was the temperature difference between the heat source and sink, and for a normal array of elements was between 45 and 50 C and for a cascade arrangement less than or equal to 75 C.

N80-21836/5 PC **A04**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for IBM System 2, Togus, Maine.
Contractor Report, May 1978 - Apr. 1979.
Jan 80, 68p NASA-CR-161383
Contract NAS8-32036
Sponsored in Part by DOE.

The solar energy system, SIMS Prototype System 2, was designed to supply domestic hot water to single family residences. The system consists of flat plate collectors, silicone working fluid, storage tanks, pumps, heat exchanger, controls, and associated plumbing. The long term field performance of the installed system was analyzed and the results are described.

ORNL/TM-7151 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Experimental Testing and Analytical Analysis of a Plastic Panel Heat Exchanger for Greenhouse Heating.
M. Olszewski, and J. F. Thomas. Feb 80, 36p
Contract W-7405-ENG-26

The performance of a plastic panel-type heat exchanger, suitable for greenhouse heating using low-grade (25 to 60 exp 0 C water) power plant reject heat, was investigated theoretically and experimentally. The theoretical analysis showed that a plastic panel heat exchanger would have an overall heat transfer coefficient, U sub 0 , of about 18 w/m exp 2 - exp 0 C compared to about 12 w/m exp 2 - exp 0 C for a fin-tube heat exchanger, under typical greenhouse conditions. Furthermore the plastic heat exchanger would require less fan power due to reduced air pressure losses. The experimental data revealed a similar functional relationship for U sub 0 and air flow when compared with the theoretical calculations, however the experimental values of U sub 0 were consistently larger by 20 to 30%. It was concluded that a properly designed plastic heat exchanger can compete with metal fin tube type exchangers on a performance basis, but the plastic heat exchangers are 3 to 4 times larger by volume. However, because of the lower cost of plastic, a substantial cost reduction is expected. It appears that further study, examining heat exchanger lifetime, performance and costs, is warranted. (ERA citation 05:016068)

PAT-APPL-6-037 077 PC **A02**/MF **A01**
Deaprtment of Energy, Washington, DC.
Cooperative Heat Transfer and Ground Coupled Storage System.
Patent Application,
P. D. Metz. Filed 8 May 79, 11p
Contract EY-76-C-02-0016
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A cooperative heat transfer and ground coupled storage system wherein collected solar heat energy is ground stored and permitted to radiate into the adjacent ground for storage therein over an extended period of time when such heat energy is seasonally maximally available. Thereafter, when said heat energy is seasonally minimally available and has propagated through the adjacent ground a substantial distance, the stored heat energy may be retrieved by a circumferentially arranged heat transfer means having a high rate of heat transfer. (ERA citation 05:020362)

PAT-APPL-6-106 192 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Automatic Thermal Switch.
Patent Application,
J. W. Cunningham, and L. D. Wing. Filed 21 Dec 79, 23p N80-21671/6, NASA-CASE-GSC-12553-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An automatic thermal switch to control heat flow is described which includes a first thermally conductive plate, a second thermally conductive plate and a thermally conductive switch saddle pivotally mounted to the first plate. A flexible heat carrier is connected between the switch saddle and the second plate. A phase-change power unit, including a piston coupled to the switch saddle is in thermal contact with the first thermally conductive plate. A biasing element biases the switch saddle in a predetermined position with respect to the first plate. When the phase-change power unit is actuated by an increase in heat transmitted through the first plate, the piston extends and causes the switch saddle to pivot thereby varying the thermal conduction between the first and second plate and through the switch saddle and flexible heat carrier. The biasing element, switch saddle and piston can be arranged to provide either a normally closed or normally opened thermally conductive path between the first and second plates.

PB80-115215 PC **E12**/MF **E12**
New Mexico Univ., Albuquerque. Technology Application Center.
Solar Thermal Heating and Cooling: A Bibliography with Abstracts. Quarterly Update January-March 1979,
Mike Arenson. Aug 79, 65p TAC-STHC-79-001
Contract NASw-2936
See also Quarterly Update Apr-Jun 79, PB80-174030.

This bibliographic series cites and abstracts the literature and technical papers on the heating and cooling of buildings with solar thermal energy. The quarterly volumes are divided into ten categories: Space Heating and Cooling Systems, Space Heating and Cooling Models, Building Energy Conservation, Architectural Considerations, Thermal Load Computations, Thermal Load Measurements, Domestic Hot Water, Solar and Atmospheric Radiation, Swimming Pools, and Economics.

PB80-115231 PC **E11**/MF **E11**
New Mexico Univ., Albuquerque. Technology Application Center.
Heat Pipe Technology: A Bibliography with Abstracts. Quarterly Update January-March 1979,
K. T. Feldman, and Satish Munje. Jun 79, 60p
TAC-HP79-001
Contract NASw-2936
See also Quarterly Update Apr-Jun 79, PB80-174022.

This bibliographic series cites and abstracts the literature devoted to the heat pipe, a simple device which can transport thermal energy with little drop in temperature. Each issue in the series is divided into the broad areas of: general information, heat pipe applications, heat pipe theory, design and fabrication, testing and operation and patents. Author, corporate source, title and subject indexes as well as a special section on patents are included. A current and historic file of documents containing essentially all articles and publications referenced in the series is maintained at the Technology Application Center.

PB80-170236 Not available NTIS
National Bureau of Standards, Washington, DC.
Economic Analysis of Alternative Envelope Designs for New Residences in the United States.
Final rept.,
S. F. Weber. 1980, 6p
Pub. in Proceedings of Int. CIB Symposium on Energy Conservation in the Built Environment (2nd), Copenhagen, Denmark, May 1979, Energy 5, n1 p63-68 1980.

An economic evaluation is conducted for selected energy-conservation investments in the envelope design of new single-family housing in the U.S. Alternative investment levels in the four major components of the building envelope are evaluated: (1) attic, (2) walls, (3) floor, and (4) windows. The analysis is conducted for five cities of widely diverse climate conditions and for the major forms of energy used for heating and cooling in the U.S. For each investment level, the internal rate of return (IRR) is calculated on an incremental basis, that is, in comparison with the next lowest level of investment for that component. This marginal IRR is used to rank alternative levels of investment for all four components so that economically optimal envelope designs can be selected for each city and energy type. Two points of view are considered in the selection of optimal designs: that of an individual homebuyer and that of a public policy planner.

PB80-170244 Not available NTIS
National Bureau of Standards, Washington, DC.
Updating Solar Performance Criteria and Standards.
Final rept.,
J. K. Holton. 1978, 8p
Pub. in Proceedings of Annual Meeting of the American Section of the Int. Solar Energy Soc., Inc. (1978), Denver, CO, August 28-31, 1978, p514-521 1978.

Findings are presented from the residential and commercial demonstration program and from a public commentary process that have led to the updating of numerous sections of the criteria and standards. A comparison is presented of the original criteria, the practical problems and the revised criteria. Topics covered include: system performance covering thermal losses, operating energy, system back-up, thermosyphoning, flow balancing, controls, safety, maintenance and check-out procedures; and component performance covering freeze protection, stratification, stagnation, materials deterioration, and heat transfer fluid quality.

PB80-173644 PC **A11**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Assessment of Integrated Urban Energy Options,
Gerald D. Pine. Feb 79, 236p MIT-EL-79-021

An initial comparison is carried out for the following residential space and water heating options: electric resistance heating, electrically-driven heat pumps, distribution of condenser temperature water combined with heat pumps to extract heat at the point of use, district heating via hot water from a combined heat-electric utility energy source, and individual gas furnaces. This comparison indicates that district heating is potentially competitive with conventional technologies for new urban areas. A more detailed analysis of the district heating option is undertaken to clarify its economics. Base case urban models, economic assumptions and distribution networks are defined and a computer program is developed to select optimum pipe sizes for the networks and to calculate life cycle costs. Cost optimization is carried out by considering thermal energy production costs as well as thermal conveyance costs. Several potential institutional barriers to district heating system implementation are identified.

PB80-174022 PC **E11**/MF **E11**
New Mexico Univ., Albuquerque. Technology Application Center.
Heat Pipe Technology: A Bibliography with Abstracts. Quarterly Update April-June, 1979,
K. T. Feldman, and Satish Munje. Aug 79, 46p
TAC-HP79-002
Contract NASw-2936
See also Quarterly Update Jan-Mar 79, PB80-115231.

This bibliographic series cites and abstracts the literature devoted to the heat pipe, a simple device which can transport thermal energy with little drop in temperature. Each issue in the series is divided into the broad areas of: general information, heat pipe applications, heat pipe theory, design and fabrication, testing and operation and patents. Author, corporate source, title and subject indexes as well as a special section on patents are included. A current and historic file of documents containing essentially all articles and publications referenced in the series is maintained at the Technology Application Center.

PB80-174030 PC **E12**/MF **E12**
New Mexico Univ., Albuquerque. Technology Application Center.
Solar Thermal Heating and Cooling: A Bibliography with Abstracts. Quarterly Update April-June 1979,
Mike Arenson. Aug 79, 207p TAC-STHC-79-002
Contract NASw-2936
See also Quarterly Update Jan-Mar 79, PB80-115215.

This bibliographic series cites and abstracts the literature and technical papers on the heating and cooling of buildings with solar thermal energy. The quarterly volumes are divided into ten categories: Space Heating and Cooling Systems, Space Heating and Cooling Models, Building Energy Conservation, Architectural Considerations, Thermal Load Computations, Thermal Load Measurements, Domestic Hot Water, Solar and Atmospheric Radiation, Swimming Pools, and Economics.

PB80-175375 PC **A04**/MF **A01**
Swedish Council for Building Research, Stockholm.
Reporting Format for Thermal Performance of Solar Heating and Cooling Systems in Buildings,
Per Isakson, William Kennish, and Egil Ofverholm. Feb 80, 61p D1:1980, ISBN-91-540-3157-5
Report on International Energy Agency Program to Develop and Test Solar Heating and Cooling Systems (Task 1). Prepared in cooperation with Royal Inst. of Tech., Stockholm (Sweden).

In order to effectively assess the performance of solar heating and cooling systems and improve the cost-effectiveness of these systems, common procedures for predicting, measuring, and reporting the thermal performance of systems and methods for designing economical, optimized systems are discussed.

PB80-175540 PC **A05**/MF **A01**
Swedish Council for Building Research, Stockholm.
Energy Conservation in Urban Development Plan,
Bertil Boos, and Gunnar Nordfeldt. 1980, 99p D9:1980, ISBN-91-540-3205-9

The report describes the consequences of different effects from a practical application of alternative low-energy systems in connection with the planning of new residential areas.

PB80-179245 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Simplified Energy Design Economics: Principles of Economics Applied to Energy Conservation and Solar Energy Investments in Buildings.
Final rept.,
Harold E. Marshall, Rosalie T. Ruegg, and Forest Wilson. Jan 80, 55p NBS-SP-544

This handbook introduces the architect and engineer to economic analysis techniques for evaluating alternative energy conservation investments in buildings. Life-cycle cost, benefit-cost, savings-to-investment, payback, and rate-of-return analyses are explained and illustrated. The procedure for discounting is described for a heat pump investment. Formulas, tables of discount factors, and detailed instructions are provided to give the reader all information required to make economic evaluations of energy conserving building designs.

SAN-1740-2 PC **A04**/MF **A01**
Aerojet Energy Conversion Co., Sacramento, CA.
Multi-Use Geothermal Energy System with Augmentation for Enhanced Utilization. Non-Electric Application of Geothermal Energy in Susanville, California. Second Quarterly Technical Report, April 1-June 30, 1978.
G. R. Cunnington, and G. K. Olson. 1978, 56p
Contract ET-78-C-03-1740

The objectives of this study are to determine the economic and technical feasibility of using the low to moderate temperature geothermal resource in the Susanville anomaly in a district heating/cooling system for public or private users and in a Part of Commerce developed in conjunction with the resources development. The Susanville resource temperature is known to be a minimum of 150 exp 0 F and is projected to be a maximum of 239 exp 0 F. Because these factors all contribute to major capital outlays, design approaches have been studied which will permit economical utilization of the resource regardless of the outcome of the drilling. The system selected will depend on the result of the drilling program. This study presents a data

base on systems for the temperature range from 150 to 239 exp 0 F. The results of the engineering and economic study currently indicate the region and conditions for economic feasibility. Based on a predicted fuel inflation rate of 7% and a municipal bond interest rate of 10%, the development of the Susanville Geo-Heating District is economically feasible over the entire range of anticipated reservoir conditions. Under conditions of high well costs ($130 to $175 thousand dollars per well) and low resources temperature (150 to 165 exp 0 F), economic and operational advantages can be shown for the use of heat pumps to augment the resource temperature. (ERA citation 05:015603)

SAN-1741-4 PC **A10/MF A01**
WESTEC Services, Inc., San Diego, CA.
Multi-Purpose Utilization of Hydrothermal Resources within the City of El Centro. Final Report.
P. B. Sherwood, S. G. Province, R. N. Yamasaki, and K. L. Newman. Apr 79, 209p
Contract ET-78-C-03-1741

The engineering and economic feasibility of utilizing geothermal heat from the Heber KGRA for space heating/cooling and water heating for domestic and industrial process applications within the City of El Centro was investigated. The analysis proceeds through an engineering survey of present conventional energy utilization within the City to identify and evaluate those end uses which could potentially utilize geothermal heat as a substitute for fossil fuel or electrically produced heating and cooling. A general engineering and economic evaluation of heat and cold delivery alternatives followed including evaluations of geothermal fluid transmission options, alternative refrigeration techniques, heat and cold transmission media options, probable systems interfaces, materials evaluations, projected conventional energy costs, life cycle costs for existing conventional systems, projected pricing requirements for privately and municipally developed geothermal resources, the relative distribution costs of heat delivery options, and estimated residential and commercial retrofit costs. A cost-effective plan for large-scale utilization of geothermal energy in El Centro for district heating/cooling and industrial applications was developed from this evaluation and preliminary conclusions drawn. Institutional barriers and environmental impacts associated with geothermal development in the City were also evaluated. Potentially adverse impacts were identified along with mitigating measures that should either completely eliminate or reduce these adverse effects to levels of insignificance. (ERA citation 05:015604)

SERI/TP-351-501 PC **A02/MF A01**
Solar Energy Research Inst., Golden, CO.
SERI DOE-2 Solar Simulator Study.
A. Eden, and D. A. Simms. Jan 80, 7p CONF-800101-6
Contract EG-77-C-01-4042
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

The Solar Energy Research Institute's (SERI) analysis of the solar energy simulator section of DOE-2, a public domain computer program that allows users to explore the energy-use patterns of proposed and existing buildings and their heating, ventilating, and air conditioning (HVAC) systems is discussed. This computer program contains a solar energy simulation portion called Component-Based Simulator (CBS) incorporated into the HVAC Plant (large equipment) section. SERI is investigating the adequacy and sensitivity of DOE-2's solar portion when various active solar energy systems and combinations of solar components are interfaced with standard space conditioning systems or used in a stand-alone mode. The components have been assembled into typical configurations and parametric test runs have been performed examining the problems associated with the program and the characteristics of the output for eventual comparison with other energy analysis computer programs. (ERA citation 05:013360)

SERI/TP-351-548 PC **A02/MF A01**
Solar Energy Research Inst., Golden, CO.
Standard Assumptions and Methods for Solar Heating and Cooling Systems Analysis.
C. M. Leboeuf. Jan 80, 7p CONF-800101-9
Contract EG-77-C-01-4042
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

A set of inputs, assumptions, analytical methods, and a reporting format is presented to help compare the results of residential and commercial solar system analyses being performed by different investigators. By the common use of load data, meteorological data, economic parameters, and reporting format, researchers examining, for example, two types of collectors may more easily compare their results. For residential heating and cooling systems, three locations were selected. The weather data chosen to characterize these cities are the Typical Meteorological Year (TMY). A house for each location was defined that is typical of new construction in that locale. Hourly loads for each location were calculated using a computerized load model that interacts with the system specified inputs characterizing each house. Four locations for commercial cooling analyses were selected from among the existing sites for which TMYs were available. A light commercial (nominal 25-ton cooling load) office building was defined and is used in all four locations. Hourly cooling and heating loads were computed for each city and are available on magnetic tape from the Solar Energy Research Insititute. (ERA citation 05:013361)

SERI/TP-351-568 PC **A02/MF A01**
Solar Energy Research Inst., Golden, CO.
Real-World Validation of SHAC Models.
L. Morrison. Jan 70, 6p
Contract EG-77-C-01-4042

A statistical approach is proposed to validation of SHAC models. It includes a definition of validation, an explanation of its purposes, and a description of the statistical aspects of experimental design. It proposes a study to validate design codes with statistical samples of real-world systems. Also included is a summary of present SHAC validation methodologies and studies as well as recommendations for future activity. (ERA citation 05:015392)

SIB-R-53-1979 PC **A04/MF A01**
National Swedish Inst. for Building Research, Stockholm.
Solar Heat as a Complement in an Oilfired Hot Water Central. Pilot Study: 53 Terrace Houses in Gothenburg, Sweden.
R. Burensten, I. Gunnarsson, A. Kasza, and M. Norrfors. 1979, 59p
In Swedish.
U.S. Sales Only.

A project is presented where a hot water central is equipped with solar collectors in order to end the inefficient use of the oil furnaces during the warm season. The warm water from the collectors is used as a heat source for an electric heat pump, which will make it possible to renounce from oil-heating half of the year. 400 m exp 2 of collectors should feed a storage tank of 40 m exp 3 . It is estimated that 44 percent of the energy would be produced by the new system. The economy of the project is discussed. (ERA citation 05:015394)

SOLAR/0902-79/70 PC **A03/MF A01**
Argonne National Lab., IL.
Reliability and Maintainability Evaluation of Solar Collector and Manifold Interconnections.
J. A. Mavec, R. Wolosewicz, A. Clark, P. Wang, and P. S. Chopra. Mar 79, 50p ANL/SDP-TM-79-4
Contract W-31-109-ENG-38

The problems associated with the interconnection devices currently in use at demonstration sites are examined. The nature and causes of interconnection-related failures are presented, together with the corrective actions that were taken. Design criteria for interconnections in solar-energy systems have been developed, and a number of guidelines are provided to assist designers in avoiding interconnection difficulties. (ERA citation 05:015447)

SOLAR/0903-79/70 PC **A03/MF A01**
Argonne National Lab., IL.
Reliability and Maintainability Evaluation of Solar Control Systems.
E. Waite, D. Patterson, L. Prucha, H. Singh, and R. Wolosewicz. Mar 79, 48p ANL/SDP-TM-79-5
Contract W-31-109-ENG-38

Control system problems affected the performance or reduced the effectiveness of 25 percent of the 47 DOE-sponsored solar heating and cooling sites that were reviewed. The reliability field information presented indicates that most of the control system problems that have been encountered so far have been design related. The second major reason some of the DOE-sponsored solar-energy systems experienced operating difficulties was improper sensor calibration, location, and installation. Defective components caused some operating problems, but the incidence of these problems was approximately one-third that of the design-related problems. After an introductory look at control systems and terminology, control problems are presented in detail. Since the major control problem is design-related, a Failure Modes and Effects Analysis (FME) on two existing systems is presented. While the FMEA cannot be used to improve the design of these operational systems, the results can be used to critique the system and to indicate where improvements can be made in future systems. Guidelines for design, sensor calibration, location, and installation are presented. In an appendix, the characteristics of various sensors that are applicable to solar-energy installations are presented. (ERA citation 05:015397)

SOLAR/1005-79/50 PC **A04/MF A01**
Boeing Aerospace Co., Seattle, WA.
Solar Project Description for Florida Gas Company's Single Family Residence, Winter Springs, Florida.
22 Jun 79, 56p
Contract EX-76-A-29-1020

The Florida Gas Company solar energy system is installed in a 1548 square-foot, three bedroom single family dwelling located in Winter Springs, Florida. The system is designed to provide solar energy for space heating, space cooling, and domestic hot water heating. Solar energy is collected by two banks of double glazed flat plate collectors with a gross area of 714 square feet. Solar energy is transferred from the collector array to a 1350 gallon underground storage tank. Water is used as the heat collection, transfer and storage medium. Freeze protection is provided by means of circulation of hot water from storage through the collectors. No anti-freeze additive is required. A 3-ton solar energy powered absorption cycle Water Chiller provides chilled water for circulation through the same air distribution system. A gas fired boiler provides supplemental thermal energy to the chiller when sufficient thermal energy is not available from storage. Original cost estimates for provisioning and installation of the Solar System are given. (ERA citation 05:013363)

SOLAR/1010-79/50 PC **A03/MF A01**
Boeing Co., Seattle, WA.
Solar Project Description for A-Frame Industries' Single Family Residence: Kaneohe, Hawaii.
27 Jul 79, 44p
Contract EX-76-A-29-1020

The A-Frame Industries site is located in Kaneohe, Hawaii, and is a single family residence containing a solar energy system designed to provide domestic hot water heating. It is an open system, utilizing city water pressure to overcome the pressure head of the DHW tank and solar collector subsystem. The system uses city water as the common heat transfer medium, and contains no energy storage tank or DHW tank heat exchanger loop. Therefore, the total operating energy is in the energy collection and storage subsystem (ECSS). The collector consists of an array of four flat-plate collectors with a gross area of 76.6 square feet. The collectors face 10 degrees east of south at an angle of 21 degrees from the horizontal. The heat transfer medium is potable water, which is stored in a 120 gallon water heater storage tank and supplied, on demand, to the domestic hot water supply. Auxiliary heat is supplied by a 4 kilowatt electrical heating element. The collector loop pump is activated when the collector temperature exceeds the storage temperature by 5 exp 0 F. The pump is stopped when this temperature difference becomes less than 2 exp 0 F. The hot water service design temperature is 140 exp 0 F. No maximum temperature control or freeze protection is pro-

vided. The house has been fully instrumented for performance evaluation of the solar system since February 1978 and the compiled data are integrated into the National Solar Data Network. Original cost estimates for provisioning and installation of the solar system are given; the final solar system and instrumentation cost are not included. (ERA citation 05:013374)

SOLAR/1011-79/14 PC **A04**/MF **A01**
IBM Corp., Gaithersburg, MD.
Solar Energy System Performance Evaluation. Albuquerque Western No. 1, Albuquerque, New Mexico, October 1978-March 1979.
C. M. Fu. 1979, 65p
Contract EG-77-C-01-4049

The Albuquerque Western site is a four-story, 110-unit apartment building in Albuquerque, New Mexico. The solar energy system consists of two independently controlled systems: one system serves domestic hot water (DHW) preheating needs, the other serves to preheat hot water used in space heating. Only the DHW system is described in this report. The solar energy system has an array of tracking collectors with a gross area of 1782 square feet. The array faces south at an angle of 35 degrees to the horizontal. Water is the transfer medium that delivers solar energy from the collector array to storage. Solar energy is stored in a 2000-gallon wooden tank that contains a plastic liner. The DHW is continuously circulated throughout the building. When solar energy is insufficient to satisfy the hot water energy requirements, auxiliary heating is provided by an inline gas-fired boiler. An operational summary of the performance of the system for the period October 1978 through March 1979 is presented. (ERA citation 05:013375)

SOLAR/1011-79/50 PC **A03**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Project Description for Albuquerque Western-1 Multi-Dwelling Building, Albuquerque, New Mexico.
Sep 79, 42p
Contract EX-76-A-29-1020

The Albuquerque Western - I solar energy system is installed in a 110-unit apartment building located in Albuquerque, New Mexico. The system is designed to provide solar energy for domestic hot water heating. The DHW solar energy collection and storage system utilizes 1782 square feet (gross) of south-facing tracking collectors mounted at a tilt angle of 35 exp 0 to horizontal. Original cost estimates for provisioning and installation of the solar system are given. (ERA citation 05:013376)

SOLAR/1014-79/50 PC **A03**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Project Description for Hei Wai Wong Multi-Dwelling Building, Honolulu, Hawaii.
Oct 79, 43p
Contract EX-76-A-29-1020

The Hei Wai Wong site is a 4-story, 55 unit apartment building in Honolulu, Hawaii. Three solar systems are installed at this project to supplement the domestic hot water (DHW) requirements, and include preheating the laundry hot water for average usage rate. The solar energy system collector-to-storage results from thermosyphoning. The flat plate collector array has a gross area of 3,002 sq ft of which 807.4 square feet is instrumented. The collectors are facing south with a collector tilt of 24 exp 0 . Collected energy is accumulated in the 1230 gallon water tank that is roof top mounted. Such preheated water can be gravity fed to the laundry and apartment units. Auxiliary heating of the hot water in each apartment is provided by 30 gallon tanks using electric resistance heat elements. Auxiliary heating of the hot water in the laundry is provided by an 85 gallon tank fired by natural gas. (ERA citation 05:013377)

SOLAR/1015-79/50 PC **A03**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Project Description for Perl-Mack Enterprises' Single Family Residences, Denver, Colorado.
21 Aug 79, 50p
Contract EG-77-C-01-4049

The Perl-Mack Enterprises Co. solar energy system(s) are installed in a total of 25 single family dwellings located in Denver, Colorado. The 25 dwellings are of three different configurations. Two of the twenty-five dwellings have been fully instrumented for performance monitoring and evaluation since September 1977. All the solar systems are designed to provide approximately 69 percent of the space heating and energy requirements for each dwelling. Solar energy is collected by an array of flat plate collectors having a gross area of 470 square feet. A water-glycol mixture is used as the medium for delivering solar heat from the collection to the storage tank. The storage tank has a total capacity of 945 gallons. A liquid-to-liquid heat exchanger, within the storage tank, transfers the stored heat from the transfer medium to the domestic hot water tank of the house. Space heating demands are met by circulating heated water/glycol mixture from the storage tank through the heat exchanger coil installed downstream from the auxiliary furnace blower. The auxiliary gas-fired furnace is activated whenever room thermostat demands heat. (ERA citation 05:013364)

SOLAR/1038-79/50 PC **A04**/MF **A01**
Boeing Co., Huntsville, AL.
Solar Project Description for Saddle Hill Trust Single Family Residences, Medway, Massachusetts.
24 Aug 79, 51p
Contract EG-77-C-01-4049

The Saddle Hill Trust solar energy systems are installed in three single family dwellings (Lots 36, 73, and 77) located in Medway, Massachusetts. Each of the dwellings are four bedroom, two story frame structures. Lot 36 has 1944 square feet, lots 73 and 77 have 1696 square feet. All these dwellings are fully instrumented for performance monitoring and evaluation. The three systems are designed to preheat domestic water. Lot 36, in addition to preheat domestic water includes solar energy for house heating. The data in this report is for lot 36, since this system is more complex and provides building heating. In this system, water is the heat transfer fluid. Solar energy is collected by two banks of flat plate collectors with a gross area of 315 square feet. Solar energy storage is provided by circulating water through the solar collectors and a heat exchanger in a 750 gallon basement equipment room storage tank. Space heating demands are met by circulating water from storage through a heating coil in the air distribution system in the house heating system. Auxiliary space heating is provided by an oil-fired warm air furnace. Solar energy for pre-heating domestic hot water is provided by circulating water from the solar storage tank through a heat exchanger in an electric domestic hot water heater. The performance of the Saddle Hill Trust Solar Energy System has been monitored since December 1978. Original cost estimates for provisioning and installation of the solar system are given; however the final cost of its instrumentation are not included. (ERA citation 05:013365)

SOLAR/1057-79/14 PC **A04**/MF **A01**
IBM Corp., Gaithersburg, MD.
Solar Energy System Performance Evaluation. Zien Mechanical Contractors No. 1: Single-Family Residence, Milwaukee, Wisconsin, October 1978-March 1979.
C. L. Werner. 1978, 67p
Contract EG-77-C-01-4049

Zien Mechanical Contractors No. 1 is a single-family residence in Milwaukee, Wisconsin. The home has approximately 1304 square feet of conditioned space. The solar energy system consists of two independently controlled systems: one system serves domestic hot water (DHW) preheating; the other is used for space heating and space cooling. Only the space heating and cooling system is described. The system has an array of flat-plate collectors with a gross area of 384 square feet. The array faces south at an angle of 53 degrees to the horizontal. Air is the transfer medium that delivers solar energy from the collector array to storage. Solar energy is stored in a rock bin containing 41,250 pounds of rock located in the basement of the house. The rock bin has 2 inches of polyurethane insulation on the outside walls and fiberglass roll insulation in the ceiling. A heat pump delivers solar energy from storage to a heat exchanger located within an air-handler. Heated air is then blown from the air-handler to the load. When solar energy is insufficient to satisfy the space heating load, an electric resistance heater in the air-handler provides auxiliary energy for space heating. The system has 10 modes of solar operation for space conditioning. The performance of the system for the period October 1978 through March 1979 is described. (ERA citation 05:013366)

SOLAR/1090-79/50 PC **A03**/MF **A01**
Boeing Co., Seattle, WA.
Solar Project Description. Albuquerque Western-II Multi-Dwelling Building, Albuquerque, New Mexico.
D. Moore. 23 Nov 79, 43p
Contract EX-76-A-29-1020

The Albuquerque Western - II site is a four-story, 110-unit apartment building in Albuquerque, New Mexico. The solar energy system consists of a controlled system to preheat hot water used in space heating. The solar energy system is designed to provide approximately 54 percent of the conditioned space heating load. The system has an array of tracking collectors with a gross area of 6429 square feet. The array faces south at an angle of 35 degrees to the horizontal. Water is used as the medium for delivering energy from the collector array to storage. Solar energy is stored underground in a 57,000-gallon concrete storage tank. During the space heating season, the heated water from storage is continuously circulated through the building to satisfy the space heating needs for each apartment. Auxiliary heating is provided by three inline gas-fired boilers. The system has three modes of operation. Original cost estimates for provisioning and installation of the solar system are given. (ERA citation 05:013367)

13B. Civil Engineering

AD-A083 042/2 MF **A01**
P/Ra Research Inc East Meadow NY
Cultural Resources Reconnaissance Survey for Geneva-on-the-Lake Small Boat Harbor Project.
Final rept.,
Martin Murphy, and Annette Silver. Feb 80, 75p
Contract DACW49-79-C-0088
Availability: Microfiche copies only.

A description of the methodology employed and the results of a cultural resources survey of the area designated for a proposed small boat basin in the Geneva State Park, Geneva-on-the-Lake, Ohio are presented. This area was subjected to both a literature review and a thorough program of field testing. The results of the investigation indicate that the area in question does not contain significant cultural materials and that the proposed construction of the boat basin may proceed without further concern for its impact on cultural resources. (Author)

AD-A083 076/0 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
A Review of Fabric Usage in Pavements Constructed on Soft Soils.
Final rept. May 78-Jun 79,
Donald M. Ladd. Dec 79, 30p FAA-RD-79-93

A literature review was conducted to investigate the uses of fabrics in pavements in order to determine their applicability for use in constructing airport pavements on soft soils. Presented are several theories as to how a fabric enhances the performance of a pavement when fabrics are used as a reinforcement or as a separator over soft soils. Several design methods are discussed and results of several field installations are presented. Current test methods and construction techniques are also discussed. (Author)

AD-A083 138/8 PC **A15**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Documentation and Analysis of Rock Island Underseepage Data.
Final rept. Jan 78-Sep 79,
Robert W. Cunny. Mar 80, 336p Rept no. WES/TR/GL-80-3

Contracts NCR-IA-78-C17, NCR-IA-78-C-26

Piezometer data from 14 pre-1960 piezometer range sites in the Rock Island District (RID) were documented and analyzed to determine landside and riverside permeability ratios. Only 7 of the 14 sites had complete data, which included piezometric pressures under both the riverside and landside slopes of the levee. Piezometer data obtained in 1979 from 15 new (1977) piezometer range sites were also reviewed, but because the calculated entrance distances, among other things, were significantly greater than the distances to the exposed substratum at the riverbank, these latter data were considered in error and were not used for analysis. Berm widths were also calculated using LMVD, RID, and WES permeability ratios. Observed seepage performance from all 29 piezometer range sites was studied and compared with berm width calculations. Berm criteria based on a creep ratio of 15 to 18, similar to that advanced in 1916 by Mr. W. G. Bligh in his book, 'Dams and Weirs', were also tried. While berm lengths were more reasonable than those mentioned above, these criteria also failed to adequately distinguish between those locations that needs berms and those that do not.

AD-A083 143/8 PC **A05**/MF **A01**
Army Armament Materiel Readiness Command Rock Island IL
Classified Scrap in Lake Superior.
Final rept. Aug 59-Jul 77,
James R. Hager, Daniel L. Wilking, and Thomas J. Wash. 8 Jul 77, 94p

Report contains the results and data on the investigation of dumping of classified waste into Lake Superior. Investigation was the result of inquiries based on the secretive nature of dumping of classified grenade scrap during 1959-1962 timeframe. (Author)

AD-A083 243/6 PC **A05**/MF **A01**
South Carolina Univ Columbia
Examination of Treatment Methods for Cyanide Wastes.
Phase rept.,
Stephen P. Shelton, and Michael J. Montebello.
15 May 79, 81p NADC-78198-60
Contract N62269-78-M-7501

A survey of the state of the knowledge for treatment of cyanide wastewater generated at Naval Air Rework Facilities was accomplished. Over 250 journal citations from nine countries were reviewed. Ninety-eight articles, considered germane to Naval problems, were incorporated into the review that evaluated the effectiveness of cyanide waste treatment as related to concentration and destruction techniques. Processes that were reviewed but rejected due to technical infeasibility are also discussed. (Author)

AD-A083 327/7 MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Hydraulics Lab
Modifications to Filling and Emptying System of Lock Number 1, Mississippi River, Minneapolis, Minnesota; Hydraulic Model Investigation.
Final rept. Jul 76-Feb 78,
Jackson H. Ables, Jr. Dec 79, 156p Rept no. WES/TR/HL-79-21
Availability: Microfiche copies only.

The existing locks at Locks and Dam No. 1 were constructed between 1929 and 1932. Problems have been experienced with accumulation of ice and debris at the intakes, air entrapment in the the culverts of the filling and emptying system, excessive turbulence in the lock chamber during filling, and hazardous conditions downstream from the locks during emptying operations. Also, the stoney gates used for control of filling and emptying, the miter gates, and miter gate operating machinery are in bad condition. Various elements of the filling and emptying system were developed in a 1:25-scale hydraulic model for use in rehabilitating the locks. Both the landward and riverward locks were investigated and recommended design and modifications were furnished to accomplish rehabilitation of both locks although only the landward lock will be completely rehabilitated. Major modifications to the locks will include constructing new intake manifolds, lowering the roof of the filling and emptying culverts and changing their shape, constructing new sidewall ports, replacing the stoney gates with tainter valves, and constructing new culvert outlets. With the rehabilitated system, the lock could be filled in 10.2 min and emptied in 10.6 min with a 4-min valve time and a 37.8-ft lift. (Author)

AD-A083 378/0 PC **A04**/MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Brier Crest Woods Dam. Delaware River Basin, Tributary to Tunkhannock Creek, Monroe County, Pennsylvania (NDI ID Number PA-00879, DER ID Number 45-245), Brier Crest Woods, Inc. Phase I Inspection Report,
Frederick Futchko. Feb 80, 75p
Contract DACW31-80-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Brier Crest Woods Dam is a homogeneous earthfill embankment with a toe drain. The dam, including the spillway, is 790 feet long and is 16 feet high at maximum section. The spillway is located near the middle of the dam. It is a concrete gravity weir with a concrete exit channel apron. The spillway crest is 25 feet long and is 5.0 feet below the design top elevation of the dam. The outlet works consists of a 12-inch diameter corrugated metal pipe in the spillway weir with a sluice gate at the upstream end. Based on visual inspection, available records, calculations, and past operational performance, Brier Crest Woods Dam is judged to be in good condition. The existing spillway will pass the Probable Maximum Flood (PMF), which is twice the Spillway Design Flood (SDF), with 0.2 foot of freeboard. The spillway capacity is rated as adequate. No stability problems were evident for the embankment. The spillway weir meets recommended guidelines for stability.

AD-A083 379/8 PC **A05**/MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Saw Creek Club Dam. Delaware River Basin, Saw Creek, Pike County, Pennsylvania (NDI ID Number PA-00764, DER ID Number 52-7), Saw Creek Club, Inc. Phase I Inspection Report,
Frederick Futchko. Feb 80, 91p
Contract DACW31-80-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Saw Creek Club Dam is an earthfill and rockfill embankment. It is 500 feet long and its design height is 16 feet at maximum section. At present, the dam is 14 feet high. The concrete gravity spillway is located at the left abutment of the dam. The spillway is 154 feet long; the leftmost part of the axis of the weir deflects downstream. According to criteria established for these studies, the spillway capacity of Saw Creek Club Dam is rated as seriously inadequate and the dam is classified as unsafe, nonemergency. The existing spillway will pass only 9 percent of the Probable Maximum Flood (PMF) without overtopping of the dam. No stability problems were evident for the embankment at the time of the visual inspection, but a potential hazard exists due to significant seepage at the toe of the dam. The spillway weir is judged to be stable for the expected loading conditions.

AD-A083 380/6 PC **A05**/MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Maple Lake Dam. Delaware River Basin, Stoffle-Denmark Creek, Pike County, Pennsylvania (NDI ID Number PA-00766, DER ID Number 52-170). Pine Ridge Community Association. Phase I Inspection Report,
Frederick Futchko. Feb 80, 81p
Contract DACW31-80-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Maple Lake Dam is a homogeneous, earthfill embankment. It is 35 feet high at its maximum section and 685 feet long. The main spillway is located at the maximum section of the dam. It consists of a reinforced concrete riser structure near the upstream toe of the dam, a 24-inch diameter conduit, and a concrete outlet structure at the downstream toe of the dam. The auxiliary spillway is an excavated, trapezoidal channel at the left abutment of the dam. Based on visual inspection, available records, calculations, past operational performance, and according to criteria established for these studies, Maple Lake Dam is judged to be in good condition. Based on existing conditions, the main and auxiliary spillways will pass an approximate minimum of 48 percent of the Probable Maximum Flood (PMF before overtopping of the dam occurs. No stability problems were evident for the embankment at the time of the visual inspection, but a potential hazard to stability exists due to erosion that might occur when there is flow in the auxiliary spillway.

AD-A083 381/4 PC **A05**/MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Hallowood Lake Dam. Delaware River Basin, Long Run, Monroe County, Pennsylvania (NDI ID Number PA-00730, DER ID Number 45-194), Hallowood Homes Association, Inc. Phase I Inspection Report,
Frederick Futchko. Feb 80, 77p
Contract DACW31-80-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Hallowood Lake Dam is a homogeneous, earthfill embankment. It is 31 feet high at its maximum section and 595 feet long. The spillway is located at the right abutment. The spillway consists of an approach channel, a concrete weir, an outlet channel, and a stilling basin. The crest length of the spillway is 55.0 feet. Based on visual inspection, available records, calculations, past operational performance, and according to criteria established for these studies, Hallowood Lake Dam is judged to be in good condition. The spillway will pass about 82 percent of the Probable Maximum Flood (PMF) without overtopping of the dam. No stability problems were evident for the embankment or the appurtenant structures at the time of the visual inspection. The ability of the outlet works to function is unknown because it has not been recently operated. Maintenance of the dam and appurtenant structures is considered inadequate.

AD-A083 382/2 PC **A05**/MF **A01**
Gannett Fleming Corddry and Carpenter Inc Harrisburg PA
National Dam Inspection Program. Panther Lake Dam. Delaware River Basin, Freeling Run, Pike County, Pennsylvania (NDI ID Number PA-00416, DER ID Number 52-157), Panther Lake Property Owners Association. Phase I Inspection Report,
Frederick Futchko. Feb 80, 80p
Contract DACW31-80-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Panther Lake Dam is a homogeneous, earthfill embankment. It is about 19 feet high at its maximum section and is 665 feet long, including the spillway. The embankment is founded on earth. The spillway is located at the right abutment and consists of an approach channel, a concrete weir, a stilling basin, and an outlet channel. The crest length is 67.2 feet. The spillway crest is 4 feet lower than the top of the dam. The outlet works is located at the maximum section of the embankment and consists of an intake structure, a 30-inch diameter reinforced concrete conduit, and an outlet structure. Based on visual inspection, available records, calculations, past operational performance, and according to criteria established for these studies, Panther Lake Dam is judged to be in good condition. The spillway will pass about 60 percent of the Probable Maximum Flood (PMF) without overtopping of the dam. No stability problems were evident for the embankment or the appurtenant structures at the time of the visual inspection.

AD-A083 383/0 PC **A04**/MF **A01**
D'Appolonia Consulting Engineers Inc Pittsburgh PA
National Dam Inspection Program. Shirf's Run Dam. Ohio River Basin, Unnamed Tributary of North Branch Blacklick Creek, Cambria County, Pennsylvania (NDI I.D. Number PA-00436, DER I.D. Number 11-71). Phase I Inspection Report,
Lawrence D. Andersen. 5 Mar 80, 61p

Contract DACW31-80-C-0022
Original contains color plates: All DTIC/NTIS reproductions will be in black and white.

Shirl's Run Dam consists of an earth embankment approximately 320 feet long with a maximum height of 15 feet from the downstream toe and a crest width of 10 feet. The upstream side of the dam is protected by riprap and the downstream slope is covered with grass. The spillway discharge facilities for the dam consist of an earth channel located at the right abutment. The outlet facilities consist of a 12-inch cast-iron pipe encased in concrete through the embankment. Based on the evaluation of the existing conditions, the condition of Shirl's Run dam is considered to be good. The only condition noted which requires attention is the lack of adequate erosion protection on the left side of the emergency spillway channel against the embankment. This condition is considered to pose breach potential in the event of large flows through the spillway. The flood discharge capacity of the dam was evaluated according to the recommended procedure and was found to pass approximately 50 percent of the probable maximum flood (PMF) without overtopping the embankment.

AD-A083 384/8 PC **A05**/MF **A01**
Baker (Michael) Jr Inc Beaver PA
National Dam Inspection Program. Zinc Dam. (NDI Number PA-00496, PennDER Number 63.7), Ohio River Basin, Branch of Burgetts Fork, Washington County, Pennsylvania. Phase I Inspection Report,
John A. Dziubek. Feb 80, 96p
Contract DACW31-80-C-0025
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Zinc Dam is a diaphragm earthfill embankment approximately 23 feet high and 410 feet long. The majority of the embankment materiel consist of low to medium plasticity clay (CL). The buttressed concrete core wall, according to the design plan, is 4 feet below the design top of dam. The spillway, located 60 feet from the right abutment of the dam, is 50 feet long and 4 feet deep as originally designed. A mortared block wall was installed in the spillway which wave subsequently covered with earth, reducing the freeborad to as low as 0.4 foot. An analysis indicated that the spillway will pass only 5 percent of the PMF before overtopping will occur. Because of seepage through the embankment and evidence of overtopping of the embankment during a hazard review on 19 September 1979, the dam was considered to be in need of emergency attention. The pool was drawn down and the Phase I visual inspection was performed on 20 November 1979. The overall condition of the dam was very poor. It is recommended that the owner give consideration to breaching the dam as an alternate to performing the necessary repairs to the structure.

AD-A083 386/3 PC **A06**/MF **A01**
Baker (Michael) Jr Inc Beaver PA
National Dam Inspection Program. Canonsburg Dam Number 2 (Johnsons Run Dam) (NDI Number PA 00506, PennDER Number 63-41), Ohio River Basin, Johnsons Run, Washington County, Pennsylvania. Phase I Inspection Report,
John A. Dziubek. Feb 80, 123p
Contract DACW31-80-C-0025
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Canonsburg Dam No. 2 (also known as Johnsons Run Dam) consists of an earthfill embankment 36 feet high and 630 feet long. The spillway consists of an ogee weir located at the right abutment of the dam. The crest length is 35 feet and the spillway crest is 4.5 feet below the crest of the embankment. An analysis indicated that the spillway will pass 45 percent of the required PMF before overtopping will occur. Because of a landslide on the downstream face and tension cracks and sloughing on the upstream face, the dam was considered to be in need of emergency attention. The landslide on the downstream face had occurred in May 1979 and the owner had initiated an engineering study into the necessary corrective measures. At the time of inspection, the pool was drawn down and construction modifications consisting of flattening the downstream slope and providing a drainage system had commenced. However, signs of instability of the upstream slope had only recently developed (November 1979) prior to the visual inspection on 4 December 1979. Because of these conditions the dam is considered to be in poor overall condition and is classified as being in an 'Unsafe' - 'Non-Emergency' condition.

AD-A083 387/1 PC **A05**/MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
Development Study of a Two-Stage Continuous Flow Impactor.
Final rept.,
Nahum Gat. Mar 80, 88p TRW-33437-6001-RU-00, ARCSL-CR-80009, AD-E410 241
Contract DAAK11-78-C-0103

Two unit of a Continuous Flow Impactor (CI) were designed, constructed and tested. The units have been calibrated using DOP droplets and their fractionation points are approximately 4 and 1 micrometers for the first and second units respectively. The principal design criteria established in previous studies have been verified, and reshaping the collection chambers has proven effective in improving performance. The steepness of the cross-over efficiency of the 1st unit is comparable to that of other commercially available impactors. The performance of the 2nd unit is not as good though; this is attributed to high particle loss in that unit. The two units have been operated in a cascade arrangement which separates an airborne 'window' of a desired particle size range - between the fractionation points of the two stages - out of a polydispersed aerosol. The particle loss mechanisms are discussed and improvements are suggested to reduce the loss. Other potential applications of the CI such as in the separation of monodispersed aerosols, density measurement of spherical particles and shape factor determination are discussed as well.

AD-A083 389/7 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Chemical Demulsification of Tanker Crude Emulsions.
Memorandum rept.,
Ralph C. Little. 13 Feb 80, 57p NRL-MR-4160, AD-E000 394

The chemical demulsification of tanker crude emulsions was studied as a function of oil type (light vs. heavy crude), demulsifier concentrations, and temperature. Aerosol OT shows promise as a chemical demulsifier of tanker crude emulsions provided that ambient temperatures are not too cold and that an appropriate concentration range is used for specific oil. The evaporation rates and viscosities of the six crudes studied are also reported in the text.

AD-A083 431/7 PC **A04**/MF **A01**
D'Appolonia Consulting Engineers Inc Pittsburgh PA
National Dam Inspection Program. Big Brown Dam. Susquehanna River Basin, Browns Run, Cambria County Pennsylvania (NDI I.D. Number PA-00502, DER I.D. Number 11-1). Phase I Inspection Report,
Lawrence D. Andersen. 5 Mar 80, 63p
Contract DACW31-80-C-0022
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Big Brown Dam consists of an earth embankment approximately 290 feet long with a maximum height of approximately 37 feet from the downstream toe, and a crest width in the range of 8 to 11 feet. The downstream slope of the dam is 1-1/2 horizontal to 1 vertical and is protected with well-established grass. The upstream slope is protected by riprap extending to the crest level of the dam. The flood discharge facilities for the dam consist of a primary spillway incorporated into the outlet facilities and an open channel emergency spillway located on the right abutment. The outlet facilities consist of a 20-inch cast-iron supply line and a 20-inch cast-iron blow-off pipe. Based on the evaluation of the existing conditions, the condition of Big Brown Dam is considered to be poor. Extensive swampy areas were observed along the toe of the dam. This condition, together with the steep downstream slope of the embankment raises concern as to the continued stability of the embankment. The flood discharge capacity of the dam was found to be at the lower limit of the recommended spillway capacity range of 50 percent to full PMF relative to the size and hazard classification of the dam.

AD-A083 511/6 Not available NTIS
Urban Resources Consultants Inc Washington DC
Guidelines for Development of Water/Sanitation Components of Urban Fringe and Rural Village Projects in Developing Countries. Volume II. Patents, Proprietary Processes & Methods Specific to Water Supply, Waste Disposal and Sanitation,
Bertram Fountain, and Harold Shipman. Dec 79, 129p
Contract AID/DS/OTR-C-0015/1979
Availability: Urban Resources Consultants, Inc., Washington, DC HC $15.00 (No copies furnished by DTIC).

In addressing the problem of helping poor people gain access to essential services, especially on the fringes of larger cities, in smaller urban centers, and in rural areas, consideration was given to the identification and better use of existing technology. What are the kinds of needs which the appropriate application of technology might address. Stated differently, what are the technological opportunities. Two United Nations conferences suggested the focus on water and sanitation. Volume I is a review of the relevant literature on urban and rural water supplies and sewage systems and of experience in the use of various technologies and methodologies in providing these services. Issues are delineated and strategies are suggested for project development, including types of facilities which are suited for water and sanitation services to urban, urban fringe, and rural areas. Volume II considers the effective use of patents and proprietary processes and methods and how they might be made more accessible to developing countries. Appended are a classification of relevant patents, a product directory, and a list of patents of particular interest for use in developing water supply and sanitation facilities and services.

AD-A083 531/4 PC **A05**/MF **A01**
Baker (Michael) Jr Inc Beaver PA
National Dam Inspection Program. Stoughton Lake Dam (Beaver Dam), Ohio River Basin. (NDI Number PA-00468, PennDER-56-78). Somerset County, Commonwealth of Pennsylvania. Phase I Inspection report.
Michael Baker, Jr. Feb 80, 88p
Contract DACW31-80-C-0025
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Stoughton Lake Dam is an earthfill dam with a maximum height of 23 feet and a crest length of 335 feet. The 90 feet crest length ogee spillway is located at the right abutment of the dam. The outlets works consist of an intake, a riser, a 36 inch corrugated metal pipe outlet conduit, and an outlet head wall. The riser is divided into two chambers by stop logs which can be removed to drawdown the reservoir. Hydraulic/hydrologic evaluations revealed that the spillway will pass the spillway design flood (SDF) on 53 percent of the Probable Maximum Flood (PMF) before overtopping will occur. Therefore, the spillway is assessed as being adequate. The dam was found to be in fair overall condition with the exception of the spillway training walls and the spillway discharge apron. The inspection revealed certain items of remedial work necessary for the dam which should be completed without delay by the owner.

AD-A083 535/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Laser Investigation of Smoke-Dust Accumulation Layer,
Sun Jing Qun, and Yang Ming. 29 Jun 79, 10p
Rept no. FTD-ID(RS)T-0357-79
Trans. of Ta-Chi Ko Hsueh (China) n2 p156-158 1977, by H. P. Lee.

No abstract available.

AD-A083 595/9 PC **A02**/MF **A01**
Florida Atlantic Univ Boca Raton Dept of Biological Sciences

Ecological Evaluation of a Beach Nourishment Project at Hallandale (Broward County), Florida. Volume I. Evaluation of Fish Populations Adjacent to Borrow Areas of Beach Nourishment Project, Hallandale (Broward County), Florida.
Miscellaneous rept.,
Walter R. Courtenay, Jr., Ben C. Hartig, and Gerard R. Loisel. Feb 80, 25p CERC-MR-80-1-VOL-1
Contract DACW72-78-M-0769

A study of the fish populations within the surf zone and over the first and second reefs off Hallandale (Broward County), Florida, was conducted, 7 years following dredging for a beach restoration project. This study utilized an observational and recording technique adapted from Jones and Thompson (1978). The data were compared with those of an earlier study conducted in 1971-72. In the 1971-72 study, conducted during and subsequent to dredging activities, 42 species of fishes belonging to 24 families were found. The present study revealed the presence of 114 species of fishes belonging to 36 families. The dusky jawfish (Opistognathus whitehursti), common along the first reef platform in 1971-72, was found to be absent. The absence of this fish is attributed to an alteration of the substate on the first reef by incursion of fine sediments. Damage to the second reef observed during 1971-72 was not evident during this study. (Author)

AD-A083 612/2 PC **A03/MF A01**
Eclectech Associates Inc North Stonington CT
Aid to Navigation Configurations and the Physical Characteristics of Waterways in 32 Major U.S. Ports.
Interim technical rept.,
W. R. Bertsche, and R. T. Mercer. Oct 79, 40p USCG-D-7-80
Contract DOT-CG-835285-A

This report is the result of extensive research into the physical characteristics of channel design and the present aids to navigation of 32 prominent U.S. ports. The findings show trends in the interactions of the variables: width, length, depth, turn radius, aid configuration, aid spacing, flash rates, and others for both day and night. These findings present a general analysis of what actually exists in the major U.S. shipping lanes. (Author)

AD-A083 625/4 PC **A04/MF A01**
Water and Air Research Inc Gainesville FL
A Summary and Evaluation of Aquatic Environmental Data in Relation to Establishing Water Quality Criteria for Munitions-Unique Compounds. Part 3. White Phosphorus.
Final rept. 1 Apr 77-31 Aug 78,
J. H. Sullivan, Jr., H. D. Putnam, M. A. Keirn, B. C. Pruitt, Jr., and J. C. Nichols. Apr 79, 72p
Contract DAMD17-77-C-7027
See also Part 2, AD-A082 437 and report dated Oct 78, AD-A060 767.

The purpose of this report is to review the effects of white phosphorus (WP) on the aquatic environment and to recommend water quality criteria for the protection of aquatic organisms. Chemical properties, analytical methods, manufacturing wastewater characteristics, and environmental fate of WP are reviewed and discussed. Four freshwater algae were exposed to WP concentrations ranging from 7 to 670 microns g/1. Two procaryotic species, Anabaena flos-aquae and Microcystis aeruginosa, showed a biostimulatory growth. Conversely, two eucaryotic species, Navicula pelliculosa and Selenastrum capricornutum showed growth inhibition. N. pelliculosa was the more sensitive with significant effects apparent at 20 microns g/1. Two marine species, Fucus distichus and Fucus vesticulosus, showed bioconcentration factors of 22X and 23X when exposed to 15 micron g/1 WP for 48 hours.

ANL/EES-TM-74 PC **A06/MF A01**
Argonne National Lab., IL.
Water Quality Impacts of Increased Coal Utilization.
S. Y. Chiu, M. F. Torpy, J. Gasper, L. J. Habegger, and L. J. Hoover. Apr 79, 101p
Contract W-31-109-ENG-38

The potential cumulative water quality impacts of expanded future coal use in the United States was investigated under the National Energy Plan (NEP). The NEP calls for nearly doubling of coal production and use over the next ten years. A surface water quality model was developed to estimate regional water quality impacts. The quantity of pollutants expected to be discharged as a result of coal extraction, coal-fired steam electric power generation, and industrial coal use was characterized in detail for individual sources with specific control requirements that take into account regional differences. From the pollutant loadings, the model calculates the incremental impacts based on dilution capacity of streams. It is concluded that, although water quality impacts from industrial coal use are expected to be greatly reduced due to the enactment of recent environmental laws, intense development of coal mining and coal-burning facilities may cause water quality problems in a few areas, notably the Upper Ohio River Basin, the Northern Great Plains, and the Upper Colorado River Basin. Judicious siting of coal mines and coal-burning facilities is needed to avoid adverse water quality impacts in areas where stream assimilative capacity is limited. Improved mine-sealing techniques for reducing acid mine drainage from underground mines in the East are also required. Additional critical water quality issues demanding close attention are: (1) leaching and migration of trace elements contained in uncombusted coal residuals; (2) acidification of water resources resulting from increased emissions and deposition of sulfur dioxide and nitrogen oxide; and (3) local and regional water quality problems resulting from reduced surface water dilution capacity due to increased water consumption. (ERA citation 05:011124)

CONF-7809192- PC **A06/MF A01**
Science Applications, Inc., La Jolla, CA.
Proceedings of the Heavy Lift Launch Vehicle Tropospheric Effects Workshop.
Dec 79, 115p
Contract W-31-109-ENG-38
Heavy lift launch vehicle tropospheric effects workshop, Rosemont, IL, USA, 12 Sep 1978.

A workshop, sponsored by the Argonne National Laboratory, on Heavy Lift Launch Vehicle (HLLV) troposheric effects was held in Chicago, Illinois, on September 12, 13, and 14, 1978. Briefings were conducted on the latest HLLV congigurations, launch schedules, and proposed fuels. The geographical, environmental, and ecological background of three proposed launch sites were presented in brief. The sites discussed were launch pads near the Kennedy Space Center (KSC), a site in the southwestern United States near Animus, New Mexico, and an ocean site just north of the equator off the coast of Ecuador. A review of past efforts in atmospheric dynamics modeling, source term prediction, atmospheric effects, cloud rise modeling, and rainout/washout effects for the Space Shuttle tropospheric effects indicated that much of the progress made in these areas has direct applicability to the HLLV. The potential pollutants from the HLLV are different and their chymical interactions with the atmosphere are more complex, but the analytical techniques developed for the Space Shuttle can be applied, with the appropriate modification, to the HLLV. Reviews were presented of the ecological baseline monitoring being performed at KSC and the plant toxicology studies being conducted at North Carolina State. Based on the proposed launch sites, the latest HLLV configuration fuel, and launch schedule, the attendees developed a lit of possible environmental issues associated with the HLLV. In addition, a list of specific recommendations for short- and long-term research to investigate, understand, and possibly mitigate the HLLV environmental impacts was developed. (ERA citation 05:014159)

CONF-800129-2 PC **A03/MF A01**
Argonne National Lab., IL.
Environmental Control Technology for Biomass Flash Pyrolysis.
J. B. L. Harkness, R. D. Doctor, and W. H. Seward. 1980, 32p
Contract W-31-109-ENG-38
Energy from biomass and wastes 4 symposium, Lake Buena Vista, FL, USA, 21 Jan 1980.

The rapid commercialization of biomass gasification and pyrolysis technologies will raise questions concerning the environmental impacts of these systems and the associated costs for appropriate control technologies. This study concentrates on characterizing the effluent emissions and control technologies for a dual fluid-bed pyrolysis unit run by Arizona State University, Tempe, Arizona. The ASU system produces a raw product gas that is passed through a catalytic liquefaction system to produce a fuel comparable to No. 2 fuel oil. Argonne National Laboratory is conducting a program that will survey several biomass systems to standardize the sampling techniques, prioritize standard analyses and develop a data base so that environmental issues later may be addressed before they limit or impede the commercialization of biomass gasification and pyrolysis technologies. Emissions will be related to both the current and anticipated emissions standards to generate material balances and set design parameters for effluent treatment systems. This will permit an estimate to be made of the capital and operating costs associated with these technologies. (ERA citation 05:016443)

COO-4375-1 PC **A09/MF A01**
McKee (Davy) Corp., Cleveland, OH.
Improved Water Management of Coal Conversion Processes by Preliminary Absorption of Halides.
Dec 79, 180p
Contract EE-77-C-02-4375

For coal conversion processes that employ wet cleaning of gases, such as those supplying cooled gas to storage or to distribution systems, gas condensates are produced that contain various pollutants. Condensates from gases derived from coal may contain gas borne particulates, tars, oils or water solubles such as ammonia, chlorides, cyanides, fluorides, phenols and sulfides. The upgrading of contaminated gas condensates to service water quality by treatment oriented technology can entail a complex sequence of processing including desalination. A modified wet gas cleaning system was proposed by Davy McKee Corporation as offering promise of improving the practicality of reuse of gas condensates from coal gasification. This production oriented technology replaced the conventional single stage quench of the gases with a system incorporating a two-stage quench. The concept advocated the removal of particulates and the absorption of halides and other strong electrolytes in a controlled first stage quench that would condense a small fraction of the water vapor contained in the product gas. This low volume primary condensate would be purged from the system. The major fraction of condensate collected by the second stage quench would be relatively free of strong electrolytes and would be amenable to processing for reuse without resort to desalination technology. The volatile weak electrolytes in the secondary condensate would be removed by steam stripping and organic substances would be removed by biological treatment. The proposal is more advantageous with coals containing more than average amounts of chlorides. (ERA citation 05:011053)

DOE/EIS-0018 PC **E08/MF E08**
Department of Energy, Washington, DC.
Final Environmental Impact Statement. Los Alamos Scientific Laboratory Site, Los Alamos, New Mexico.
Dec 79, 627p

The statement assesses the potential cumulative environmental impacts associated with current, known future, and continuing activities at the Los Alamos Scientific Laboratory (LASL) site. This includes the adverse impacts from postulated accidents associated with the activities. Various effluents including radioactive ones are released to the environment. However, a continuing, comprehensive, monitoring program is carried out to assist in the control of hazardous effluents. Alternatives considered to current operation of LASL include: cessation or relocation of programs; continue activities as presently constituted; further limitation of adverse impacts by institutional or other improvements in various operations; and expansion of current activities. (ERA citation 05:012547)

DOE/ET/14876-1 PC **A02/MF A01**
Oklahoma State Univ., Stillwater. School of Chemical Engineering.

Catalysts for Upgrading Coal-Derived Liquids. Quarterly Report, October 1-December 31, 1979.
B. L. Crynes. 13 Jan 80, 12p
Contract AC01-79ET14876

The design and partial construction of a new trickle-flow, packed bed reactor system was achieved. This reactor will be used to conduct investigations of throwaway type catalysts and zoned or mixed catalyst beds. It will also be used to support studies of catalyst activity decay. Most of these decay studies will be conducted in the Catalyst Life Test Unit (CLTU). The CLTU has been improved by redesign of the H sub 2 flow system and several minor changes. A new H sub 2 supply system has been designed and items ordered for installation. One experimental run was conducted in one of the three reactors of the CLTU. Raw anthracene oil was the feedstock and a vendor catalyst was used (Nalco, NM-502, Ni-Mo-Al sub 2 O sub 3). Run conditions were: 700F(371C), 1500 psig and 2.0 hour space time (volume hourly). The objective of this run was to test equipment, familiarize personnel and to obtain a data base for future experiments. The sulfur removal was better than 95% throughout the 162 hours of operation. However, nitrogen removal activity decayed from 70% to about 35% after only 30 to 50 hours. (ERA citation 05:011083)

DOE/TIC-10280 PC **A07**/MF **A01**
All Indian Pueblo Council, Inc., Albuquerque, NM.
Transcript of Proceedings of a Public Hearing on August 16, 1979 in Albuquerque, New Mexico, on the Draft Environmental Impact Statement, Geothermal Demonstration Program, Baca Ranch, Sandoval, and Rio Arriba Counties, New Mexico, Before the All Indian Pueblo Council.
1979, 136p

To show that geothermal energy can contribute to the nation's energy supplies, development of a 50-megawatt geothermal project located in Redondo Creek Canyon on the Baca Ranch is planned. It is funded by DOE, Union Oil Company, and Public Service Company of New Mexico. The project is intended to stimulate industrial development by showing that geothermal development can be profitable, that it can be environmentally responsible, and that it can be socially acceptable. The public hearing deliberates the impacts from water usage, transportation, pollution, housing, production or generation of electricity, economics, and many other important aspects. Secondary factors such as employment, training, infringement of religious areas, transmission lines, archaeological sites, and subsidence are equally important. Statements were heard from government and industry representatives and testimony was heard from Pueblo representatives. (ERA citation 05:011748)

DOE/TIC-10287 PC **A13**/MF **A01**
All Indian Pueblo Council, Inc., Albuquerque, NM.
Transcript of Proceedings of a Public Hearing on August 30, 1979 in Albuquerque, New Mexico, on the Environmental Impact Statement, Geothermal Demonstration Program.
1979, 289p
Portions of document are illegible.

Hearings on the Geothermal Demonstration Program for the 50-megawatt electrical power plant on the Baca Ranch in the Jemez Mountains is presented. DOE, the Union Oil Company, and Public Service Company of New Mexico are sponsoring the project. Union has been drilling and testing wells in this area since 1971 and evidence shows a geothermal reservoir capable of supporting 400 MW(e). Union will drill the producing wells and provide steam to the power plant. Public Service will buy the electricity-generating power plant and the transmission lines to take the power to market. The wells and construction are scheduled to be completed by March of 1982 and the demonstration project is to be completed in March 1987. This draft environmental statement represents the best information available on the potential impacts of the geothermal development on the Baca Ranch. Persons interested in the impacts of the project posed questions and members of a technical panel provided replies at the public hearing. (ERA citation 05:011749)

FE-1817-6 PC **A08**/MF **A01**
Arizona Univ., Tucson. Dept. of Chemical Engineering.
Pollutant Control Through Staged Combustion of Pulverized Coal. Final Report, May-October, 1978.
J. O. L. Wendt, and J. W. Glass. May 79, 161p
Contract EX-76-C-01-1817

Pulverized fuel was burned in a 2 kg/hr aerodynamically well-defined plane flame combustor, and the resulting time resolved profiles of CO sub 2 , CO, O sub 2 and NO were measured. In this final report on Contract E 49-18-1817 the influence of pulverized fuel composition on NO formation mechanisms is emphasized, with particular stress on the role of coal volatile content. The latter quantity was varied by burning first an FMC char with 3.6% Volatile Matter, then an IGT char with 13.6% Volatile Matter and lastly a series of various coals comprising a lignite, a subbituminous coal, and three bituminous coals. These fuels were investigated under fuel rich and staged combustion conditions. Under staged combustion, second stage NO was found to be strongly influenced by the amount of first stage volatile nitrogen carryover. The latter quantity depended on the first stage fuel richness and on the amount of volatiles in the coal. Under fuel rich conditions the NO profile was controlled by the fuel nitrogen volatility relative to the volatility of the non-nitrogeneous combustibles in the coal. A series of tests on one coal showed that the observed decay of NO in the first fuel rich stage could be simply correlated with temperature. This latter result implies that a high heat removal rate in the first stage of a staged combustion process will lead to minimum NO emissions after staging. (ERA citation 05:012989)

FE-2034-16 PC **A03**/MF **A01**
Montana State Univ., Bozeman.
Catalytic Hydrogenation for Coal-Derived Liquids. Interim Report, June-August, 1979.
L. Berg, and F. P. McCandless. Sep 79, 43p
Contract EX-76-C-01-2034

The concept of fabricating catalysts specifically designed to hydrodenitrogenate solvent refined coal has been continued. Using catalyst bases of specific surface area, pore volume and pore diameter and impregnating them with tungsten, nickel, cobalt and/or molybdenum has yielded denitrogenation of SRC from 1.17% nitrogen to as low as 0.01% nitrogen after 45 minutes use and 0.1% nitrogen after 90 minutes, and desulfurization of SRC from 0.73% to as low as 0.2% sulfur after three hours. The catalysts appear to be a cross between hydrotreating and hydrocracking catalysts and will require a burn-off and resulfiding after four to six hours of operation. Five additional catalysts have been discovered which appear to offer the possibility of an economically attractive process for converting solvent-refined coal into a feedstock suitable for a conventional petroleum refinery. (ERA citation 05:011086)

FE-2222-9 PC **A10**/MF **A01**
Southern Co. Services, Inc., Birmingham, AL.
Full-Scale Utility Boiler Test with Solvent Refined Coal.
R. D. McRanie. Jul 79, 220p
Contract EX-76-C-01-2222

Southern Company Services, Incorporated recently completed a study of the shipping, handling, and burning characteristics of a new, clean-burning fuel called solvent refined coal (SRC). This culminated in an 18-day burn test in the Unit 1 boiler of Georgia Power Company's Plant Mitchell near Albany, Georgia. The SRC burn test was an unqualified success and a significant milestone in the overall objective of qualifying coal-derived fuels for a variety of future energy needs. Test data revealed SRC to be so nearly pollution-free than it clearly surpasses current EPA standards. During Phase I, the existing circular burners were used to burn coal. For Phases II and III of the burn test, water-cooled, dual register burners developed especially for the Plant Mitchell test by Babcock and Wilcox (B and W) were installed. These burners performed adequately while burning coal during Phase II, and delivered excellent performance during Phase III using SRC as fuel. Boiler efficiency measurements performed throughout the burn test indicated that efficiency at full load was essentially the same when either SRC or coal was burned. An added advantage, from an operating standpoint, was that the boiler stayed much cleaner with SRC than with coal, eliminating the need for deslagging the burner front or the use of soot blowers during the entire 18-day burn test. The successful conclusion of the solvent refined coal burn test represents a large step in the continuing efforts by the Southern electric system to bring this clean coal process out of the laboratory and into the generating plant. When compared to the alternative approaches to meeting electric energy needs in environmentally acceptable ways, the SRC technology seems clearly in the forefront by an consideration. It is clean, uncomplicated in application, and promises to make greater use of the nation's vast coal resources. (ERA citation 05:014690)

FE-2542-23 PC **A04**/MF **A01**
Conoco, Inc., Stamford, CT.
Phase 1: The Pipeline Gas Demonstration Plant. Analysis of Coal, by-Products and Waste Waters from the Technical Support Program.
G. W. Heunisch, and G. J. Leaman, Jr. Aug 79, 55p
Contract EF-77-C-01-2542

The data reported herein will assist in the design of the Demonstration Plant and in the marketing of the by-products. The leaching studies of coal and slag will assist in determining the applicable environmental handling of these materials. Complete analysis of two of the feed coals for the Demonstration Plant -- Pittsburgh No. 8 coal and Ohio No. 9 coal -- are reported. These analyses will assist in setting specifications for coal feedstock procurement. Both of these coals were evaluated in the pilot plant program.Conoco Coal Development Company investigated the leaching of run-of-mine Ohio No. 9 coal, cleaned Ohio No. 9 coal, and the refuse from the washing. This simulation of rainfall weathering of unprotected piles of the materials shows that the components which are leached do not exceed the Resource Conservation and Recovery Act proposed guidelines. Analysis of various samples indicates all the slags are similar in composition. Both Conoco Coal Development Company and Oak Ridge National Laboratory investigated the leachability of the slag. The results show that only trace concentrations of the EPA priority pollutants are leached from the slag. Analyses of the slag quench water, oil separator water, and tar separator water provides information for design of the treatment facilities and the potential for reuse of the treated water in the Demonstration Plant. Naphtha, tar oil and recycle tar were characterized in detail and based on these results, the materials were classified as possible oil refinery feedstocks. (ERA citation 05:014652)

FE-2721-7 PC **A03**/MF **A01**
West Virginia Univ., Morgantown. Coll. of Mineral and Energy Resources.
Utilization of Coal Associated Minerals. Quarterly Report No. 7, April 1, 1979-June 30, 1979.
J. F. Slonaker, J. K. Alderman, W. H. Buttermore, D. B. Gierl, and W. C. Grady. 28 Sep 79, 26p
Contract EF-77-S-01-2721
Portions of document are illegible.

This report continues the documentation of detailed characterization of both raw and prepared fractions of coal feeds, products, and refuse from the preparation plant in northern West Virginia. It also documents the installation and initial operation of two recently acquired instruments, i.e., a Scanning Electron Microscope and an X-Ray Powder Diffractomer. Other areas where significant work was achieved include froth flotation of the Pittsburgh sample and the quantitative determination of kaolinite using IR. This work is documented herein. Work was continued in the quarter to determine the utilization of Pope, Evans and Robbins fluidized bed combustion by-products in fired structural materials. (ERA citation 05:014743)

FE-3199-5 PC **A02**/MF **A01**
Florida State Univ., Tallahassee.
Electron Beam Ionization for Coal Fly Ash Precipitators. Quarterly Report, July 14-October 13, 1979.
R. H. Davis. 1979, 23p
Contract ET-78-S-01-3199

Completion of Task I was reported in the Annual Report. With this report Task II is complete. The

objective of Task II was the quantitative measurement of the copious ionization produced by electron irradiation in a good geometry so that the results could be compared with the value expected from the stopping power relations established in nuclear physics and the specific ionization for air. The agreement is good. Since the ultimate objective is a field unit which will compete both in performance and cost with other alternatives, possible embodiments are considered as they are conceived. An embodiment based on the mobility differential between charged particles and molecular ions is discussed in the attached patent disclosure. It is too early to argue the economic advantages of such an embodiment but it appears to offer the advantage of a retrofit preionizer. (ERA citation 05:011845)

IAEA-R-1456-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Investigations of Effects of Thermal Discharges in Rhine River Waters. Part of a Coordinated Programme on the Physical and Biological Effects of Cooling Systems and Thermal Discharges at Nuclear Power Plants. Final Report for the Period 1 January 1974 - 30 April 1977.
W. Schikarski. Dec 78, 1p
U.S. Sales Only.

The report envisages two aspects of cooling systems: heat exchange between water and atmosphere; cooling tower plume modeling. The author gives the estimated "cooling capacity" of German rivers and estuaries and describes a station at Rheinhausen, measuring directly the heat exchange between the river Rhine and the atmosphere. The influence of meteorological and topographical parameters is discussed, and the total uncertainty in extrapolating formulae is assessed. A number of field studies have been carried out to measure plume behavior of cooling towers and to provide the data basis for comparison of existing models. The average plume rise is well predicted. The experimental program carried out in Germany since 1973 is described. The one-dimensional models TOWER and SAUNA.S are in agreement with experimental results except for short plumes. The last plume model WALKURE shows considerable improvement. It is specially suited for the calculations of the cooling tower plume behavior under influence of temperature and humidity stratifications in the ambient atmosphere. (Atomindex citation 10:441407)

INIS-mf-4095 PC **A03**/MF **A01**
Bonnenberg und Drescher Ingenieurgesellschaft m.b.H., Juelich (Germany, F.R.).
Upper Rhine Waste Heat Project. Tasks and Targets of the Project.
W. Schikarski. Mar 77, 28p
In German.
U.S. Sales Only.

The tasks and targets of the project are: 1) Determination of the parameters relevant for an assessment of consequences, e.g.: General influences on weather and climate, anthropogenic influences on weather and climate, effects, affected systems, boundary conditions, anthropogenic changes in boundary conditions. 2) Developing a method of evaluation. 3) Establishing a sensitivity model and carrying out analyses. 4) Determining interface parameters which relate this project to other projects. 5) Summary of the findings and preparation of the main study. The cooperating institutions are: UBA, GfK, KFA, Deutscher Wetterdienst, University Bonn (Inst. f. Meteorology), Bonnenberg + Drescher GmbH, ISI (FhG Karlsruhe). (Atomindex citation 09:365335)

LBL-9707 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Floating Breakwater Performance Comparison.
V. W. Harms. Nov 79, 23p CONF-800314-1
Contract W-7405-ENG-48
17. international conference on coastal engineering, Sydney, Australia, 23 Mar 1980.

Wave-transmission and mooring-force data of the Tethered-Float Breakwater and Pole-Tire Breakwater (PT-Breakwater) were compared, and the basic costs (without mooring system) of two equivalent breakwaters determined. It was found that, for short-fetch applications, the PT-Breakwater was an order of magnitude less costly than the Tethered-Float Breakwater. The PT-Breakwater is a more effective wave-energy filter than a Tethered-Float Breakwater of equal size. For open ocean conditions neither of these breakwaters has so far been proven to be economically feasible. (ERA citation 05:016342)

LETC-3096-1 PC **A06**/MF **A01**
Colorado Univ. at Boulder. Dept. of Civil, Environmental, and Architectural Engineering.
Removal of Ammonia and Alkalinity from Oil Shale Retort Waters.
B. L. Harding, K. D. Linstedt, and E. R. Bennett.
Apr 79, 102p
Contract ET-78-S-03-1769

The possibility of removal and recovery of ammoniacal nitrogen from in-situ oil shale retort waters with weak acid cation exchange resins was investigated. The performance of several resins were compared and one resin selected for detailed evaluation. In this evaluation, the effect of various operating parameters on the effectiveness of the weak acid cation exchange system for NH sub 4+ -N removal was researched. Resin regeneration with both strong acids and CO sub 2 was evaluated. The results indicated some potential for the treatment of stripped retort waters with weak acid cation exchange resins in the sodium form. Recovery of NH sub 4+ -N from the resins and its separation from metals heavier than magnesium was accomplished by the use of dissolved CO sub 2 . (ERA citation 05:014866)

N80-21890/2 PC **A15**
National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.
Environmental Impact Statement for the Kennedy Space Center, 1978 - 1979 Revision.
Final Report.
Oct 79, 338p NASA-TM-81015
Revised. Original Contains Color Illustration Supplements.

The ongoing operation of KSC for expendable launch vehicles and automated spacecraft, continued development of facility capabilities, and the approved follow-on operations of the Space Transportation System and associated payloads are described. Emphasis is placed on the expendable launch vehicle and space shuttle traffic projected as of January, 1979. The maximum potential effect on the environment is addressed. Site specific environmental effects are summarized. It is indicated that all potential impacts will be localized, of short duration, controllable, and of minimum severity. The impact on land use, air and water quality, weather, and noise effects is covered.

N80-21891/0 PC **A06**/MF **A01**
Systems Applications, Inc., San Rafael, CA.
Introductory Study of the Chemical Behavior of Jet Emissions in Photochemical Smog.
Final Report.
G. Z. Whitten, and H. Hogo. May 76, 115p
NASA-CR-152345, EF76-04R
Contract NAS2-8821
Sponsored in Part by FAA, Washington, D. C.

Jet aircraft emissions data from the literature were used as initial conditions for a series of computer simulations of photochemical smog formation in static air. The chemical kinetics mechanism used in these simulations was an updated version which contains certain parameters designed to account for hydrocarbon reactivity. These parameters were varied to simulate the reaction rate constants and average carbon numbers associated with the jet emissions. The roles of surface effects, variable light sources, NO/NO2 ratio, continuous emissions, and untested mechanistic parameters were also assessed. The results of these calculations indicate that the present jet emissions are capable of producing oxidant by themselves. The hydrocarbon/nitrous oxides ratio of present jet aircraft emissions is much higher than that of automobiles. These two ratios appear to bracket the hydrocarbon/nitrous oxides ratio that maximizes ozone production. Hence an enhanced effect is seen in the simulation when jet exhaust emissions are mixed with automobile emissions.

ORNL-MIT-129 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Oak Ridge, TN. School of Chemical Engineering Practice.
Adsorption and Filtration of Trace Contaminants in Aqueous Effluents.
M. M. Irizarry, and D. B. Anthony. 28 Apr 71, 45p
Contract W-7405-ENG-26

The removal of trace copper contaminants from aqueous effluents by means of adsorption on ion exchange resins was studied. A semicontinuous, axial filtration device was used to obtain mass transfer data as a function of the operating parameters: flow rate, resin volume and size, temperature, rotational speed, and system geometry. Correlation of data based on power dissipation per unit volume is presented. Operation of the unit involved high product fluxes (1000 to 15,000 gpd/ft exp 2) and adsorption efficiencies (90 to 99+%) coupled with low pressure drops. (ERA citation 05:016646)

PAT-APPL-6-039 427 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Gas Cleaning Apparatus.
Patent Application,
Filed 15 May 79, 12p
Contract EF-76-C-01-2428
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A gas cleaning apparatus located in a high temperature (up to 1000 exp 0 F) high pressure (20 or more atmospheres) gas flow path between a coal gasifier and a gas turbine, for removal of entrained dust having particle diameters in the range of 1 to 10 microns from the gas stream, includes an outer housing which encloses an inner rotatable, cylindrical centrifuge having a graduated series of vanes formed on the outside of the centrifuge. The vanes on the exterior surface of the centrifuge smoothly accelerate the process gas to a high tangential velocity to separate the particulate impurities from the gas, while not triggering secondary mixing of the particulate impurities. The gas enters a cyclone at maximum axial velocity and ultra-high tangential velocity where the particulate matter separates and is ejected from the bottom of the cyclone. The centrifuge encloses an integral, interior, axial turbine through which the cleaned high pressure process gas from the core of the cyclone vortex flows to drive the turbine and the centrifuge. (ERA citation 05:019894)

PB80-168339 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
An Approach to the Construction of the Regional Water Resource Model.
Final rept.,
M. Albegov, and V. Chernyatin. c1978, 46p RM-78-59

The contemporary analysis of regional development is unthinkable without taking into account the water resource factor. Many specific properties of the regional water resource model developed for this purpose result from that information about water resources which is necessary for the regional planner. In actual fact, he would like to know not so much what the water supply or quality management system should be, as what the influence of water resource availability on regional development is. In the present approach such an influence is implemented through the mechanism of the total cost associated with the creation of regional water supply and treatment systems as well as the marginal water costs distributed geographically. The regional water resource model consists of the two interconnected systems: water supply and water quality management.

PB80-169105 PC **A05**/MF **A01**
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Transportation in Underdeveloped Countries.
Feb 79, 98p
Sponsored in part by Agency for International Development, Washington, DC.

These papers were presented in one of the Work-Sessions at the Second International Symposium of Engineering held at 'Universidad Centroamericana Jose Simeon Canas' from the 19th to the

23rd of February 1979. The document describes problems in underdeveloped countries related to transportation; rapid urbanization, which leads to the development of high residential areas, and often bad-planned transportation systems. Energy expenditure in transportation is usually a high percentage of total Energy consumption; therefore, the necessity of evaluating transportation programs and planning transportation alternatives is of prime importance, especially because present trends indicate that such energy consumption is increasing.

PB80-169972 PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
State Implementation Plan Emission Regulations for Sulfur Oxides: Fuel Combustion (Second Edition).
Final rept.,
J. D. Crenshaw, and C. H. Kuo. Sep 77, 99p EPA-450/2-76-002A
See also report dated Mar 76, PB-251 174.

This report presents a one or two page summary of each state's implementation plan (SIP) regulations for sulfur oxides. The report also explains the relationship between the SIP regulations, the National Ambient Air Quality Standards, and the Federal Standards of Performance for New Stationary Sources, and briefly discusses the various types of emission regulations which appear in the SIPs. This report updates the March 1977 edition to reflect changes to the SIP regulations which have been approved through August 1977.

PB80-170004 PC **A02**/MF **A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Lead Particles in the Great Smoky Mountains Biosphere Reserve.
Interim rept.,
G. B. Wiersma, C. W. Frank, K. W. Brown, and C. I. Davidson. Jan 80, 19p EPA-600/4-80-002
Prepared in cooperation with Iowa Univ., Iowa City, and Carnegie-Mellon Univ., Pittsburgh, PA.

Remote air monitoring using 0.45-micrometer Millipore filters at eight remote sites in the Great Smoky Mountains National Park has shown that lead particulates are contributing to the contamination of this designated biosphere reserve. Analytical results of these filters by atomic absorption spectrophotometry, x-ray fluorescence, and scanning electron microscopy showed that lead air concentrations varied frm a high of 141.ng/cu m to a low of 18.9 ng/cu m. The spherical shape of the lead particulates indicates that the moieties were formed by high temperature processes, such as by internal combustion engines. Also, the small particulate size may indicate long range transport and subsequent deposition from urban and/or industrialized areas.

PB80-170392 PC **A07**/MF **A01**
Environmental Quality Systems, Inc., Rockville, MD.
Symposium on Management of Toxic Materials in Municipal Sludges; Overview Papers and Summaries of Discussion.
Mar 79, 127p NSF/RA-790408
Grant NSF-PFR78-15074
Symposium held at Miami Beach, Florida on March 21-23, 1979.

This symposium provided an opportunity for intensive communication and exchange of information among those active in the field of toxic materials in sludge. Four major areas of interest provided the focus: (1) impact of legislation on toxic materials in sludge; (2) toxic pollutant sources; (3) sludge characteristics and (3) control of toxic materials in sludge. This document presents the four overview papers which correspond to the four interest areas, as well as summaries of the discussions in each task group.

PB80-170749 PC **A11**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Rail-Highway Crossing Hazard Prediction Research Results.
Final rept. Jan-Aug 79,
Peter Mengert. Mar 80, 250p DOT-TSC-FRA-79-1, FRA-RSS-80-02

The document presents techniques for constructing and evaluating railroad grade crossing hazard indexes. Relative and absolute hazard indexes are constructed and compared in performance with some hazard indexes in general use. The DOT-AAR crossing inventory for all public crossings in the United States and the FRA accident data base for 1975 are used. Various measures and displays of performance of hazard indexes in predicting the hazard of crossings as functions of their inventory characteristics and as manifest in the U.S. accident experience of 1975 are given. The levels of performance that may be expected of various hazard indexes in various situations are given. Means for shaping a relative hazard index into an absolute hazard index are given. An introductory discussion is provided on the use of accident history in hazard indexes.

PB80-170764 PC **A03**/MF **A01**
TRW, Inc., Redondo Beach, CA.
Residual Oxidants Removal from Coastal Power Plant Cooling System Discharges: Field Evaluation of SO2 Addition System.
Final rept. Jan-Nov 79,
K. Scheyer, and G. Houser. Mar 80, 41p EPA-600/7-80-049
Contract EPA-68-02-2613

The report gives results of an evaluation of the performance of a dechlorination system that uses SO2 to remove residual oxidants from chlorinated sea water in a power plant cooling system. Samples of unchlorinated, chlorinated, and dechlorinated cooling water were obtained at Pacific Gas and Electric's Potrero power plant in San Francisco. The samples were collected during 28 sampling periods--14 at flood tide and 14 at ebb tide--and analyzed for several chemical and physical constituents. An amperometric titrator was used for field analysis of total oxidant residual (TOR) and free oxidant residual (FOR). Analytical results, plant operating data, and laboratory experiments were used to evaluate the dechlorination system. Major conclusions include: (1) the dechlorination system studied showed effective removal of residual oxidants from chlorinated sea water used in the power plant cooling system; (2) the dechlorination system proved reliable (no measurable oxidant residual was found at the effluent outfall); and (3) due to the effectiveness of the dechlorination system in removing all measurable oxidant residual, average and maximum levels of dechlorination cannot be determined.

PB80-170988 PC **A04**/MF **A01**
Cal Recovery Systems, Inc., Richmond, CA.
Benefits and Problems of Refuse-Sludge Composting.
C. G. Golueke, D. Lafrenz, B. Chaser, and L. F. Diaz. Mar 80, 66p NSF/RA-800027
Grant NSF-PFR79-17407

A high-speed shredder, a rototiller, and a front-end loader were used to evaluate their effectiveness for mixing and aerating mixtures of refuse and digested sludge cake for composting. The material to be composted consisted of a 1:1 (gravimetric) mixture of digested sludge and refuse lights. Three piles were set up, one pile to be processed by each one of the three pieces of equipment being evaluated. Analytical determination included moisture content, total and volatile solids contents, and concentrations of C, N, and some heavy metals. Results of the research indicate the following: (1) The light fraction of refuse is an excellent bulking agent for composting digested sludge cake, provided the initial mixing and aeration are conducted properly; (2) A machine having the design characteristics of the shredder used in the investigation would best supply the required mixing/aeration; (3) High temperatures and odor-free composting are not always coincidental; and (4) At a 1:1 gravimetric ratio, refuse lights accomplish a substantial dilution of the heavy metal content of the sewage sludge.

PB80-171259 PC **A08**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Structures Design.
Rigid Pipe Proof Testing Under Excess Overfills with Varying Backfill Parameters. Section V (Volume 8). Neutral Point Analysis Output: Quasi-Theoretical, Concrete, Extreme Fiber Stresses.
Interim rept.,
R. E. Davis, F. M. Semans, D. W. Spannagel, and A. E. Bacher. Feb 79, 155p FHWA/CA/SD-79/10
See also Section 5, Volume 4, PB80-166432.

The neutral point analysis described in SECTION 5 (Volume 1) was employed to determine quasi-theoretical extreme fiber stresses at the inner and outer peripheries of the walls of the Cross Canyon, reinforced concrete culvert, using normal and tangential tractions modified to satisfy equilibrium considerations. A 400 psi (2760 Kilonewtons per square meter) line has been included on the profiles to designate and anticipated limiting concrete tensile stress. Quasi-theoretical boundaries of cracking of the culvert's inner wall indicated by intersections of the inner fiber stress profiles with this limiting stress line are compared with observed cracking limits in SECTION 8: Analysis of Distress.

PB80-171366 PC **A11**/MF **A01**
Pacific Consultants, Boston, MA.
Proceedings of a Workshop on Tunnel Lining Design Held at Cambridge, Massachusetts on March 12-13, 1979.
Dec 79, 234p DOT-TSC-UMTA-80-7, UMTA-MA-06-0100-80-2
Contract DOT-TSC-1526

The workshop provided a forum for the identification and discussion of problems in the design and construction of tunnels centering around six topics, namely: Lining Design, Qualification, Geotechnical Investigations, Observational Approach, Specifications, and Constructibility and Cost Considerations. A position paper on each topic is arranged together with appropriate discussions from the working group members. In addition to background information regarding the planning of this workshop, this report also contains the keynote address, position papers, names and addresses of subcommittee members, as well as information about the six topics discussed at the workshop.

PB80-173537 PC **A03**/MF **A01**
Weston (Roy F.), Inc., West Chester, PA.
Sacramento Regional Wastewater Management Program: Policy Issues and Recommendations.
Policy summary.
Dec 75, 47p NSF/STP-7601910/1
Contract NSF-STP76-01910

This report is an evaluation of the EPA's Wastewater Treatment Facilities Grants Planning Process as funded under the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500). The Policy Issues and Recommendations discussed here are based on the information developed by the 5 reports to NSF/OMP by contractors/agencies. They include: (1) Public Policy relative to the requirement of cost effectiveness in pollution control should be clarified; (2) Administrative policy should enforce detailed planning according to specific guidelines; (3) Time constraints of PL 92-500 should be relaxed; (4) PL 92-500 should authorize the administrator to define the limits on control objectives and stipulate the relationship of these grants availability; (5) More specific requirements for implementation of reuse, recycling and land treatment should be developed.

PB80-173545 PC **A03**/MF **A01**
Kansas Water Resources Research Inst., Manhattan.
Measuring the Social Impacts of Water Resources Projects.
Project completion rept. Jul 76-Sep 78,
Cynthia B. Flynn. Apr 80, 29p CONTRIB-205, W80-04601, OWRT-A-084-KAN(1)
Contract DI-14-34-0001-7035

Two water resources projects, the Hillsdale Dam Construction and the Mud Creek Rechannelization, were examined in order to determine whether projects of different sizes produce social impacts of different sizes. The study (1) identified a wide range of social impacts (dependent variables) and those of elements of the projects which affect the magnitude of the impacts (independent variables); (2) defined appropriate geographical impact areas within which changes in the independent variables could be expected to effect changes in the dependent variables; (3) operationalized the varia-

bles so that measurements could be obtained for the impact areas; (4) measured the variables for projects in the planning stages; and (5) monitored the variables over time, that is, during and after the construction of the projects.

PB80-173578 PC **A03**/MF **A01**
Oklahoma Water Resources Research Inst., Stillwater.
Intergovernmental Aspects of Water Transfer in Identification and Assessment of Federal and Interstate Issues and Constraints.
Final technical completion rept.,
Joseph W. Westphal, and James J. Lawler. Apr 80, 36p W80-04602, OWRT-A-084-OKLA(1)
Contract DI-14-34-0001-9038
Prepared in cooperation with Oklahoma State Univ., Stillwater. Dept. of Political Science.

Intergovernmental aspects of water transfer from eastern to central and western Oklahoma were analyzed vis-a-vis three neighboring states (Texas, Arkansas, and Kansas). The three major objectives of the study were: to identify new proposals and developments since release of Phase I of the Oklahoma Comprehensive Water Plan; to identify major inter-state and national-state issues raised by the plan; and to assess the implications of these intergovernmental factors for implementation of the Plan.

PB80-173586 PC **A08**/MF **A01**
Missouri Water Resources Research Center, Rolla.
The Evaluation of a Synthetic Material for Use as a Wave Protection Agent on Irrigation Dams.
Completion rept.,
Richard W. Stephenson, Larry D. McCallister, and Dennis L. Dutton. 1 Mar 80, 175p W80-04599, OWRT-B-122-MO(2)
Contract DI-14-34-0001-8098

This report presents the results of a field and laboratory testing program to evaluate the performance of a slope protection method using a new synthetic fabric material in the form of soil filled bags. The results of this investigation indicate that the system is readily installed on irrigation dams and offers excellent slope protection. The results of the model study investigation indicate that the stability of sand pillows is primarily a function of wave height, wave period, embankment slope angle, and individual sand pillow weight. A possible design equation was developed for a silty clay soil such that the wave height calculated for a given reservoir could be utilized to determine the weight of the individual sand pillow necessary to economically and effectively protect the embankment.

PB80-173594 PC **A06**/MF **A01**
Skidmore, Owings, and Merrill, Boston, MA.
AGT Aesthetics: A Handbook for Planning and Design of Automated Guideway Transit (AGT) Systems.
Feb 80, 114p UMTA-IT-06-0165-79-2
Contract DOT-UT-70008
Prepared in cooperation with Cambridge Systematics, Inc., MA.

The Handbook presents (1) a broad range of aesthetic problems and opportunities which the designer or local official is likely to encounter in planning for an AGT system and identifies planning and design responses to these problems and opportunities; (2) describes planning and design tools and resources available to the users of this book; (3) contains descriptions of the various techniques that can be used to analyze the aesthetic effects of AGT systems; (4) describes techniques for organizing and presenting these data to community residents, business people, and local officials; and (5) references other reports that may assist the user in identifying and responding to aesthetic concerns.

PB80-173636 PC **A24**/MF **A01**
Radian Corp., Austin, TX.
Technology Assessment Report for Industrial Boiler Applications: NOx Flue Gas Treatment.
Final rept. Jun 78-Nov 79,
Gary D. Jones, and Kevin L. Johnson. Dec 79, 574p EPA-600/7-79-178G
Contract EPA-68-02-2608
See also PB80-150873.

The report gives results of an assessment of the applicability of NOx flue gas treatment (FGT) technology to industrial boilers and is one of a series of technology assessment reports to aid in determining the technological basis for a New Source Performance Standard for Industrial Boilers. The status of development and performance of alternative NOx FGT control techniques were assessed and the cost, energy, and environmental impacts of the most promising processes were identified. Cost estimates of applying SCR processes in the U.S. indicated that the cost effectiveness varies significantly depending on the fuel fired, boiler size, and control level. For regulatory purposes this assessment must be viewed as preliminary, pending results of the more extensive impact studies required by Clean Air Act Sect. III.

PB80-173685 PC **A05**/MF **A01**
California Univ., Davis. Div. of Environmental Studies.
The Sacramento Regional Wastewater Management Program: Some Political and Institutional Considerations,
Geoffrey Wandesforde-Smith, and Jeffrey Trant. Dec 75, 78p NSF/PRA-76-SP0425/1

This report is an evaluation of the EPA's Wastewater Treatment Facilities Grants Planning Process as funded under the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500). This volume considers the Political and Institutional Aspects of the clean water grants program.

PB80-173693 PC **A99**/MF **A01**
Kennedy Engineers, Inc., San Francisco, CA.
Sacramento Regional Wastewater Management Program. A Scientific and Technical Evaluation of the Environmental Protection Agency's Facilities Planning Process.
Final rept.,
Robert A. Kennedy, and William A. Anderson. Nov 75, 633p 5040, NSF/STP-7521604
Contract NSF-C-1041, Grant NSF-STP75-21604

This report is an evaluation of the Environmental Protection Agency's Wastewater Treatment Facilities Grants Planning Process as funded under the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500). The project is a part of an interagency case study of the EPA Municipal Construction Grants Program authorized by the Office of Management and Budget. The case study is the Sacramento Regional Wastewater Management Program. The Sacramento Regional County Sanitation District planned to consolidate existing treatment plants into one new regional plant and to solve the stormwater overflow problems of Sacramento.

PB80-173776 PC **A21**/MF **A01**
Gulf Research and Development Co., Cheswick, PA.
Effect of Ambient Temperature on Vehicle Emissions and Performance Factors. Appendix A: Test Results for All Vehicles. Appendix B: Plots of Exhaust Gas Catalyst Out Temperatures.
Final rept.,
R. S. Spindt, R. E. Dizak, R. M. Stewart, and W. A. P. Meyer. Sep 79, 500p EPA-460/3-79-006B
Contract EPA-68-03-2530
See also Appendix C, PB80-173784.

Ambient temperatures have been reported to affect automotive emissions and fuel economies since 1966. Federal automobile emission standards and the measured fuel economies are currently based on results obtained using the 1975 Federal Test Procedure and the Highway Fuel Economy Test. Both tests must be conducted at ambient temperatures from 68F (20C) to 86F (30C). Since cars in service must start and run over a much broader temperature range than this, the U.S. Environmental Protection Agency wanted to know how well the various car age groups and emission control technologies available today would perform at the more extreme ambient temperatures using the above test procedures as well as other specialized tests. It was also desired to know how the use of a car's air conditioner would affect exhaust emissions and fuel economies. This report presents the results of exhaust emissions (regulated and unregulated) and fuel economies associated with fourteen selected vehicles tested at ambient temperatures ranging from 0 deg F (-18C) to 110F (43C) using the various test procedures.

PB80-173784 PC **A99**/MF **A01**
Gulf Research and Development Co., Cheswick, PA.
Effect of Ambient Temperature on Vehicle Emissions and Performance Factors. Appendix C: Gas Chromatographic Results.
Final rept.,
R. S. Spindt, R. E. Dizak, R. M. Stewart, and W. A. P. Meyer. Sep 79, 824p EPA-460/3-79-006C
Contract EPA-68-03-2530
See also Appendices A and B, PB80-173776.

This report presents the results of exhaust emissions (regulated and unregulated) and fuel economies associated with fourteen selected vehicles tested at ambient temperatures ranging from 0F (-18C) to 110F (43C) using the various test procedures. This Appendix gives the gas chromatographic results obtained in this program.

PB80-173941 PC **A13**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Treatment Technology for Pesticide Manufacturing Effluents: Atrazine, Maneb, MSMA, and Oryzalin.
Final rept. Mar 77-Sep 78,
L. W. Little, R. A. Zweidinger, E. C. Monig, and W. J. Fith. Feb 80, 280p EPA-600/2-80-043
Contract EPA-68-02-2612

The report gives results of laboratory and pilot studies of the treatability of wastewaters generated by the manufacture of the pesticides maneb, oryzalin, atrazine, and MSMA. Wastewaters were characterized for pesticide content, routine parameters, and toxicity to fish, algae, and activated sludge organisms. Biological treatability was evaluated in terms of ability of pilot activated sludge systems (1) to successfully operate on a mixture of municipal and pesticide wastewaters and (2) to remove the pesticide and other toxic materials. Ability of activated carbon to treat the wastewaters was determined in adsorption isotherm tests and in granular activated carbon column tests. Study results showed that atrazine, oryzalin, and maneb wastes could be treated successfully with activated carbon, although such treatment had high cost potential. Oryzalin waste disrupted biological treatment. Atrazine and MSMA waste did not disrupt biological treatment, but pesticide concentration was not reduced by biological treatment. Maneb concentrations were reduced by biological treatment, but additional work is needed to determine the fate of breakdown products from the biological treatment of maneb wastewaters.

PB80-174063 PC **A17**/MF **A01**
Montana Water Resources Research Center, Bozeman.
Quantification of Non-Point Water Pollutants from Logging, Cattle Grazing, Mining, and Subdivision Activities.
Completion rept.,
John Edward Schillinger, and David Gordon Stuart. Aug 78, 390p MUJWRRC-93, W80-04669, OWRT-C-7054(6207)(1)
Contract DI-14-34-0001-6207

Water quality data were collected over a two-year period at 57 points in the Hyalite Creek and Bozeman Creek watersheds in southwestern Montana to determine the contribution of different activities to changes in the water chemistry, suspended sediment levels, and bacterial indicator count in streamflow. Cattle grazing increased fecal coliform; a cattle grazing index is formulated and correlated with the fecal coliform concentration and is shown as a function of a grazing management rating to relate a cattle management system to water quality. Clearcut logging did not significantly affect water quality. Although soil erosion occurred in clearcut areas, little sediment reached the streams from disturbances more than 30m away. Stormwater runoff, septic tank drainfields and construction in subdivisions in urban and suburban areas significantly altered the bacteriological and chemical quality and amount of suspended sediment in stream.

PB80-174105 PC **A06**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Transport and Road Research, 1978.
Annual rept.
c1979, 119p ISBN-0-11-550402-8
See also report dated 1977, PB-289 116.

Contents: Transport planning studies; Public passenger transport; Rural transport; Freight transport; Energy and road transport; Environmental effects; Highway planning, Earthworks and underground pipes; Road pavement design; Road-making materials; Construction processes and control; Road surface irregularity and riding quality; Highway maintenance; Tunnel design and construction; Bridge design and performance; Bridge construction and maintenance; Traffic and accident data and analysis; Traffic medicine; Road design and safety; Traffic and safety in urban areas; Highway traffic and safety; Vehicle design and safety; Road safety education and publicity; Overseas activities (transport planning, traffic and safety, engineering geology, road user costs, highway engineering, cooperative research in Ghana; advice on road planning and construction; training and information services).

PB80-174220 PC **A08**/MF **A01**
Municipal Environmental Research Lab., Cincinnati, OH.
Computer-Aided Synthesis of Wastewater Treatment and Sludge Disposal Systems,
Lewis A. Rossman. Dec 79, 162p EPA-600/2-79-158

A computer-aided design procedure for the preliminary synthesis of wastewater treatment and sludge disposal systems is developed. It selects the components in the wastewater treatment and sludge disposal trains from a list of candidate process units with fixed design characteristics so that criteria on effluent quality, cost, energy, land utilization, and subjective undesirability are best satisfied. The computational procedure uses implicit enumeration coupled with a heuristic penalty method that accounts for the impact of return sidestreams from sludge processing. The programmed version of the design procedure, called EXEC/OP, has been interfaced with the unit process subroutines contained in a previously EPA developed system evaluation program known as EXECUTIVE. A number of case study design problems are presented to demonstrate the versatility of EXEC/OP. Included among these is a preliminary cost/energy-effectiveness analysis for a hypothetical design problem containing over 15,000 alternative system configurations.

PB80-174253 PC **A08**/MF **A01**
Bureau of Reclamation, Denver, CO. Engineering Research Center.
Bicycle-Safe Grate Inlets Study. Volume 4. Hydraulic Characteristics of Slotted Drain Inlets.
Final rept. Nov 77-Jul 79,
C. A. Pugh. Feb 80, 157p FHWA-RD-79-106
See also Volume 1, PB-273 510.

The volume presents results of tests conducted on slotted drain inlets. Tests were conducted to study the effect of individual parameters on the efficiency of slotted drains. Total flow capture tests were done at full scale for various roadway roughness, types of transverse spacer bars, slot widths, distances from curb to slot, and combinations of flow and slope conditions. Additional tests were conducted to investigate partial flow interception capacity, sheet flow interception capacity, interception capacity of slot in a sump condition, and relative debris handling ability of slotted drain in a sump condition and on a grade.

PB80-174287 PC **A11**/MF **A01**
Science Applications, Inc., McLean, VA.
Spill Prevention, Control and Countermeasure Practices at Small Petroleum Facilities.
Final rept.,
Nicolas P. Trentacoste, George R. Bierman, and James Cunningham. Jan 80, 227p EPA-600/7-80-004
Contract EPA-68-03-2032

A study was conducted of small petroleum production and petroleum products distribution facilities (stripper wells and bulk plants) to determine ability to comply with the oil pollution regulation (40 CFR Part 112). Four regions of the United States were covered: Texas/Oklahoma, Louisiana, Penn-Grade (Pennsylvania, Ohio, Kentucky, West Virginia, New York), and New England. Field surveys were conducted at 125 individual facilities: 55 production facilities and 18 bulk plants in the Penn-Grade region, and 17 bulk plants in New England. The facilities themselves were categorized into generic types, both within regions and across-the-board. Numerous technical problems were identified involving the ability of these facilities to comply with the regulation and the techniques selected by the owners and operators to achieve compliance. Existing spill prevention, control and countermeasure (SPCC) plans (required by the regulation) for the facilities visited were reviewed and assessed for adequacy if the owners/operators made them available.

PB80-174303 PC **A07**/MF **A01**
Indiana Univ. at Bloomington. Water Resources Research Center.
Urban Hydrology in Karst and Water Quality - Inorganic and Organic Systems.
Rept. of investigation no. 9,
R. V. Ruhe, D. W. Clark, and M. L. Epstein. Mar 80, 149p W80-04597, OWRT-C-7681(7256)(3)
Contract DI-14-34-0001-7256

Storm runoff and water quality were studied in ten watersheds with little to increasingly greater urbanization in karst terrain in the Bloomington, Indiana area. Among rainfall, storm runoff, flow duration, and response time, total storm flow relates best to, and directly to total rainfall. This effect increases as impervious cover increases among the watersheds whose characteristics include size, cover, slope, drainage lengths, and density. Storm peak discharge increases as size increases. Duration of storm runoff and response time decrease as impervious cover increases. Karst complicates the system. Storm runoff in one watershed is transferred underground and causes delayed high stream flow in another watershed. Storm runoff contains many volatile organic compounds and paraffinic oils, polycyclic aromatic hydrocarbons, fatty acids, pesticides, and polychlorinated biphenyls among non-volatile compounds.

PB80-174329 PC **A02**/MF **A01**
Southeastern Louisiana Univ., Hammond. Coll. of Business.
The Impact of Environmental Protection Regulations on Research and Development in the Industrial Chemical Industry. Executive Summary,
Joe C. Iverstine, Jerry L. Kinard, and William S. Slaughter. May 78, 19p NSF/PRA-7621321/1
Grant NSF-PRA76-21321
See also PB80-174337.

As a result of the implementation of environmental protection regulations, operations of chemical firms have been significantly affected. This project investigated the impact of these regulations on R&D in the chemical industry. The researchers investigated the following areas: (1) the manner in which environmental protection regulations have changed or influenced traditional R&D activity; (2) the effect of these changes; and (3) an examination of the underlying bases for these changes. Primary data were collected by personal interviews at 15 major R&D centers of firms which conducted seventy-one percent of chemical R&D. Major findings are as follows: (a) there has been a curtailment in traditional R&D projects; (b) research to solve environmental protection projects has been effective as assessed by compliance with regulations; (c) numerous new products have been screened out because of potential environmental considerations; and (d) the impact on R&D has been uniform across the country.

PB80-174337 PC **A07**/MF **A01**
Southeastern Louisiana Univ., Hammond. Coll. of Business.
The Impact of Environmental Protection Regulations on Research and Development in the Industrial Chemical Industry. Final Report,
Joe C. Iverstine, Jerry L. Kinard, and William S. Slaughter. May 78, 143p NSF/PRA-7621321/2
Contract NSF-PRA76-21321
See also PB80-174329.

As a result of the implementation of environmental protection regulations, operations of chemical firms have been significantly affected. This project investigated the impact of these regulations on R&D in the chemical industry. Major findings are as follows: (a) there has been a curtailment in traditional R&D projects; (b) research to solve environmental protection projects has been effective as assessed by compliance with regulations; (c) numerous new products have been screened out because of potential environmental considerations; and (d) the impact on R&D has been uniform across the country.

PB80-174402 PC **A06**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Leonardo, NJ.
OHMSETT (Oil and Hazardous Materials Simulated Environmental Test Tank) Evaluation Tests: Three Oil Skimmers and a Water Jet Herder.
Final rept.,
Douglas J. Graham, Robert W. Urban, Michael K. Breslin, and Michael G. Johnson. Feb 80, 110p EPA-600/7-80-020
Contract EPA-68-03-2642
Prepared in cooperation with Coast Guard, Washington, DC., Geological Survey, Reston, VA., and Department of Navy, Washington, DC.

A series of performance tests was conducted at the U.S. Environmental Protection Agency's OHMSETT facility with three selected oil spill pickup devices (Skimmers) and a water jet boom/skimmer transition device. The objective of the skimmer tests were to establish the range of best performance for each device under the manufacturer's design limits and to document test results on 16-mm film and by quantitative measures of performance.

PB80-174907 PC **A08**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Structures Design.
Rigid Pipe Proof Testing Under Excess Overfills with Varying Backfill Parameters. Section V (Volume 9) - Neutral Point Analysis. Output: Quasi-Theoretical Reinforcing Steel Stresses.
Interim rept.,
R. E. Davis, F. M. Semans, D. W. Spannagel, and A. E. Bacher. Feb 79, 154p FHWA/CA/SD-79/11
See also PB80-166432.

The neutral point analysis described in SECTION V (Volume 1) was employed to determine quasi-theoretical stresses in the reinforcing steel embedded in the walls of the Cross Canyon, reinforced concrete culvert, using normal and tangential tractions modified to satisfy equilibrium considerations.

PB80-175037 PC **A07**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Pilot-Scale Field Tests of High-Gradient Magnetic Filtration.
Fina rept. Sep 77-Dec 79,
Charles H. Gooding. Mar 80, 143p EPA-600/7-80-037
Contract EPA-68-02-2650

The report gives results of using a 5100 cu m/hr mobile pilot plant to evaluate the effectiveness and economics of applying high-gradient magnetic filtration (HGMF) to particulate emission control. A 4-1/2 month test program was conducted at a Pennsylvania sintering plant to characterize the performance of the pilot plant and to demonstrate its practicality under long-term operation. Analysis of the results indicates that high-efficiency collection can be achieved economically if HGMF is applied to steel industry dusts that are more homogeneous and more strongly magnetic than the tested sinter dust. The report describes laboratory pilot-plant work that demonstrated collection efficiencies greater than 99% with basic oxygen furnace and electric arc furnace dusts. The development of a filter cleaning system and the design and construction of the pilot plant are discussed. Experimental data are reported.

PB80-175318 PC **A06**/MF **A01**
North Dakota Water Resources Research Inst., Fargo.

Irrigation Return Flow Treatment by Biological Denitrification Process for Nitrate Removal.
Technical completion rept. Oct 77-Jan 79,
Yung-Tse Hung, and Guilford O. Fossum. Sep 79, 105p W80-04610, OWRT-A-058-NDAK(1)
Contract DI-14-34-0001-8036
Prepared in cooperation with North Dakota State Univ., Fargo., and North Dakota Univ., Grand Forks.

Anaerobic upflow continuous biological filters were used to remove excessive nitrate-nitrogen (NO3-N) from irrigation return flows which typically contain high concentrations of NO3-N. A maximum NO3-N level of 10 mg/l in drinking water is specified by national regulations. For the study synthetic irrigation return flow was used composed of water from the Water Treatment Plant at Grand Forks, North Dakota, supplemented with various concentrations of sodium nitrate and methanol. Anaerobic bacteria from settled sludge from the Water Treatment Plant were acclimated in a batch reactor for two months. For the filters, three columns were constructed of clear lexan polycarbonate to a height of 6 ft with a 3 in inside diameter. Feed concentrations were varied from 5 to 100 mg/l NO3-N and methanol to NO3-N ratios ranged from 0.5 to 3.0. Various hydraulic loading rates tested ranged from 132 to 1,222 gpd/sq ft. Results show that the filters are a feasible method of denitrification of irrigation return flow.

PB80-175326 PC **A04/MF A01**
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Problemas Hidraulicos en Paises Centroamericanos (Water Problems in Countries of Central America),
Pedro Miguel Estrada, Fidel Antonio Ramos, Daysi Sobalvarro, and Ricardo Jimenez. Feb 79, 72p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

Three studies in water problems are presented. Water Problems in El Salvador is a technical study of the cycle of water in this country, with final recommendations to solve future problems of scarcity. Torrential Problems in El Salvador is a study of the land, water resources, inclination of the land, soils, and sewages. Water Supply in Rural Areas cites international agreements on the problem of water supply, statistics, and analysis of the problem. A bibliography, maps, and photos are included.

PB80-175334 PC **A03/MF A01**
Kansas Water Resources Research Inst., Manhattan.
Solubility of Selected Major and Minor Elements from Coal, Gob and Fly Ash Accumulations.
Completion rept. Jul 77-Sep 79,
D. A. Kposick, and E. E. Angino. Mar 80, 29p W80-04604, OWRT-A-087-KAN(1)

Nine different fly and bottom ashes, representing four coal producing areas of the United States were used in leaching experiments for Ca, Mg, Na, K, Fe, Mn, Zn, Cu, Pb, and Cd and the potential for contamination of ground and surface water supplied by these elements. Both fly ash and bottom ash are formed by the thermal decomposition or dehydration of inorganic impurities in coal and vary with the type of coal used. Many factors affect leachate characteristics such as coal preparation methods, method and efficiency of combustion, method of disposal, particle morphology, and others.

PB80-175383 PC **A07/MF A01**
California Univ., Davis. Interdisciplinary Systems Group.
Land Use, Energy Flow, and Decision Making in Human Society. Volume 2. Regional Modeling, Technical Reports.
Annual rept. no. 2.
Jan 73, 141p NSF-RA-E-73-373A
Grant NSF-GI-27
See also Volume 1, PB80-133655.

This volume consists of six technical reports or reprints published during the past year as part of a research project to develop simulation models of land use and energy flow in human society, with special attention to the State of California. The articles are: World Dynamics--A Note; Parameter Identification and Dynamic Models of Socioeconomic Phenomena; Projecting Global Energy Demand; A Blueprint for Survival; An Empirically Based Birth Rate Model for Use in Large Systems Studies of Society; and Legislative Analysis--Two Approaches.

PB80-175474 PC **A11/MF A01**
California Univ., Santa Barbara. Marine Science Inst.
Oil Pollution Abstracts. Volume 6, Number 3 (July 1979-September 1979).
Quarterly rept.,
Helmut Ehrenspeck, Barbara Searles, Katherine Osteryoung, and David Bonvouloir. Jan 80, 249p EPA-600/7-80-007
Grant EPA-R-805803-01
See also Volume 6, Number 2, PB80-141583.

OIL POLLUTION ABSTRACTS (formerly entitled OIL POLLUTION REPORTS) is a quarterly compilation of current literature and research project summaries. Comprehensive coverage of oil pollution and its prevention and control is provided, with emphasis on the aquatic environment. This issue contains bibliographic citations with abstracts of scientific and technical publications and patents covering the years 1976 to 1979. The literature and research entries are arranged in eight major categories comprised of thirty-seven specific subcategories. A permuted Subject Keyword Index provides access to every entry, and author and patent indexes are included.

PB80-175508 PC **A11/MF A01**
JBF Scientific Corp., Wilmington, MA.
Workbook/Users Manual for Prediction of Instantaneously Dumped Dredged Material.
Final rept. Aug 76-Jul 79,
L. R. Davis, G. W. Bowers, and M. K. Goldenblatt. Feb 80, 227p EPA-600/3-80-034
Grant EPA-R-804994

This manual describes the operation and use of a computer model developed to predict the physical fate of dredged material instantaneously released into the water column. The model predicts the spacial distribution of various components of the dumped material as a function of time. Output includes material concentration and position while in the water column and material mound height and concentration after bottom impact. Included in this report are a description of the model's structure and a complete explanation of its input/output formats. In addition, the model has been run for a matrix of input conditions. Both the input and output of these runs are presented as tables in dimensionless form. These working tables can be used to approximate the fate of dredged material without requiring the user to actually run the model. Several examples showing how these tables can be used are also given.

PB80-175581 PC **A02/MF A01**
Environmental Protection Agency, Ann Arbor, MI. Inspection and Maintenance Staff.
Analysis of Propane Gain Used as a Screen on the Portland Element III Sample.
Technical rept.,
David Brzezinski. Mar 80, 10p EPA-AA-IMS/PS-80-3

Propane gain values have been collected from 292 Portland Element III (1975-77 model year) vehicles along with as-received FTP and idle test emission measurements. This data is used here to compare the expected failure rate, errors of commission, and the amount of FTP excess emissions identified if one of two sets of idle values or one of four propane gain values had been used as a cutpoint to screen the vehicles in the sample with high emissions.

PB80-175599 PC **A03/MF A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Advanced Combustion Systems for Stationary Gas Turbine Engines: Volume I. Review and Preliminary Evaluation.
Final rept. Dec 75-Sep 76,
S. A. Mosier, and R. M. Pierce. Jan 80, 49p FR-11405-VOL-1, EPA-600/7-80-017A
Contract EPA-68-02-2136
See also Volume 2, PB80-175607.

The reports describe an exploratory development program to identify, evaluate, and demonstrate dry techniques for significantly reducing NOx from thermal and fuel-bound sources in stationary gas turbine engines. Volume 1 covers Phase I of the four-phase effort. In Phase I, duty cycles were analyzed to identify current and projected dominant operating modes and requirements of stationary gas turbine engines. These analyses indicate that as compression ratios and turbine inlet temperatures are increased to improve thermal efficiency, uncontrolled NOx emissions can be expected to double in 10 years and triple in 20 years. An extensive survey was made of candidate combustor concepts, and an analytical study was made from which those concepts considered to have significant potential for reducing production of NOx were identified. An initial compilation of 26 combustor design concepts was assembled, indicating potential for controlling NOx from clean fuels and/or fuels containing significant amounts of bound nitrogen. Computer simulations of these combustor concepts aided in prioritizing the designs prior to experimental screening in a bench-scale combustor test rig. The experiments were carried out under Phase II and are described in Volume 2.

PB80-175607 PC **A16/MF A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Advanced Combustion Systems for Stationary Gas Turbine Engines: Volume II. Bench Scale Evaluation.
Final rept. Sep 76-Jan 78,
R. M. Pierce, S. A. Mosier, C. E. Smith, and B. S. Hinton. Jan 80, 355p FR-11405-VOL-2, EPA-600/7-80-017B
Contract EPA-68-02-2136
See also Volume 1, PB80-175599.

The reports describe an exploratory development program to identify, evaluate, and demonstrate dry techniques for significantly reducing NOx emissions from stationary gas turbine combustors. (Volume 1 documents the research activities leading to selection of 26 combustor design concepts which could potentially meet the program goals.) Volume 2 documents the Phase II bench-scale evaluation of those concepts to experimentally evaluate their emission reduction potential. Results from the testing program identified two design approaches capable of significant emission reduction. A staged centertube design, relying on burner operation near the lean blowout limit, gave low NOx and CO emissions on clean No. 2 fuel oil, but was ineffective for fuels containing bound nitrogen. A rich-burn/quick-quench (RB/QQ) design, producing a fuel-rich primary zone and quickly quenching the effluent from that region to the high overall excess air conditions required by the gas turbine cycle, successfully controls NOx from both thermal and fuel-bound sources while maintaining low CO emissions for high thermal efficiency. The RB/QQ concept was selected for scaleup to full size hardware in Phases III and IV.

PB80-175631 PC **A04/MF A01**
Geological Survey, Lawrence, KS. Water Resources Div.
Evaluation of Methods for Estimating Ground-Water Withdrawals in Western Kansas.
Water-resources investigations (Final),
Claud H. Baker, Jr. Sep 79, 75p USGS/WRD/WRI-80/017, USGS/WRI-79-92
Prepared in cooperation with Kansas Water Resources Board, Topeka.

Quantities of annual ground-water withdrawals currently are reported by the individual user to the Kansas State Board of Agriculture. It is estimated that these values are 10 to 15 percent higher than actual values because most users do not possess the means for accurately determining discharge rates. Methods of estimating ground-water use in western Kansas that appear to offer the desired accuracy include (1) extrapolation from a sample of metered withdrawals, (2) calculation from precipitation and irrigated acreages of various crop types, and (3) calculation from a sample of power-coefficients. All three methods are being tested and compared with actual measured values.

PB80-175656 PC **A06**/MF **A01**
Geological Survey, Harrisburg, PA. Water Resources Div.
Nonpoint-Source Discharges in Pequea Creek Basin, Pennsylvania, 1977.
Water-resources investigations,
Janice R. Ward, and David A. Eckhardt. Nov 79, 117p USGS/WRD/WRI-80/016, USGS/WRI-79-88
Prepared in cooperation with Susquehanna River Basin Commission, Harrisburg, PA.

A study of Pequea Creek included measurement of streamflow and collection of water and bottom-material samples during selected base-flow and storm periods from February to December 1977. Samples were analyzed for nitrogen and phosphorus species, suspended sediment, organic carbon, and pesticides. The objective of this project was to assess the magnitudes and types of nonpoint discharges that affect the water quality of Pequea Creek. The project included the determination of (1) the total discharges of suspended sediment, nitrogen, and phosphorus from the basin; (2) intermittent storm and base-flow discharges from six subbasin sites of varying size, geology, and land use; (3) the difference in magnitudes of the discharges during base-flow periods and storms; and (4) which variables most affect the transport of these constituents.

PB80-175730 PC **A13**/MF **A01**
JRB Associates, Inc., McLean, VA.
Materials Balance for Methyl Chloroform. Level II.
Final rept.,
Timothy McCartin, Le-Tan Phuoc, Terry Shannon, and Kathy Wagner. Jan 80, 300p EPA-560/13-80-003
Contract EPA-68-01-5793

A Level II materials balance for methyl chloroform was performed. Using 1978 data, the results of this materials balance included emission factors, the equations required to calculate environmental releases, and multimedia environmental losses for each production process and end use. Assumptions used to calculate the environmental losses were analyzed and an uncertainty was given to each. Recommendations were developed to close data gaps. These recommendations identified monitoring requirements and sites and suggested those end uses for future studies.

PB80-175797 PC **A04**/MF **A01**
Central Piedmont Urban Observatory, Charlottesville, VA.
West Main Street, Charlottesville, Virginia, Present Conditions and Future Prospects.
Final rept.
Jul 77, 53p
See also PB-278 845. Sponsored in part by National League of Cities/U.S. Conference of Mayors, Washington, DC.

The general purpose of the proposed project is to define the nature and extent of current problems and their causes in the corridor, and to develop a set of feasible guidelines and strategies to guide private business and public agencies in the improvement of the area.

PB80-175938 PC **A07**/MF **A01**
Purdue Univ., Lafayette, IN. Combustion Lab.
Emissions from Aircraft Fuel Nozzle Flames.
Final rept.,
J. H. Tuttle, R. A. Shisler, R. W. Bilger, and A. M. Mellor. Jul 75, 150p PURDU-CL-75-04
Contract EPA-R-802650

Experimental emissions data from both internal flame and exhaust plane gathered in a simulated gas turbine primary zone at typical combustor operating conditions are analyzed in terms of the developed time parameters. Results indicate that, with a well atomized fuel spray, the large scale turbulent mixing controls the flame stoichiometry and hence the emissions characteristics. However as the fuel atomization becomes poorer, the flame structure is altered and emissions characteristics can be explained only by a combination of heterogeneous and homogeneous processes. Because CO and NOx emissions originate in separate regions of the flame, it was possible to alter the turbulent mixing properties of each region such that both CO and NOx were reduced.

PB80-176027 PC **A13**/MF **A01**
Northwestern Univ., Evanston, IL. Transportation Center.
Method for Understanding and Predicting Destination Choices.
Final rept. May 74-May 77,
Peter R. Stopher. Dec 79, 283p DOT/RSPA/DPB/50-79/39
Contract DOT-OS-40001

The principal goal of the research reported here is to develop a proto-type model of destination choice from the basis of individual-choice hypotheses and the application of attitudinal enquiry. The secondary goal is to determine new kinds of measures of site attractiveness for destination-choice models, substituting for conventional measures of size, such as employment or floor area. The next task of the research was to develop a data base appropriate for testing the hypotheses of the research. A variety of models were constructed from the data and subjected to a number of tests.

PB80-176100 PC **A08**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Water Resources Research Inst.
The Effect of Sewage Effluent on the Structure and Function of a Freshwater Tidal Marsh Ecosystem.
Final technical completion rept.,
Dennis F. Whigham, Robert L. Simpson, and Kwok Lee. Feb 80, 171p W80-04674, OWRT-B-060-NJ(4)
Contract DI-14-34-0001-6099
Prepared in cooperation with Rider Coll., Lawrenceville, NJ. Dept. of Biology and Trenton State Coll., NJ. Dept. of Biology.

The effects of spraying chlorinated secondarily treated sewage on a Delaware River freshwater tidal wetland for three years was studied. Macrophyte net primary production was significantly lower in the experimental sites receiving sewage than in the no treatment controls in 1975 but not in 1976 or 1977. Diversity of annuals was reduced in the experimental sites largely due to the elimination of annuals. Although percent N and P were generally high in the vegetation of experimental sites, there was little difference in total N and total P between treatments and controls. Macrophyte decomposition rates were little affected by sewage application. Substrate N and P were not significantly different between sites, but surface litter of the experimental sites accumulated N and P. Epibenthic algae may contribute to this accumulation. Water quality studies showed the high marsh to be metabolically active. These results are compared with those of similar studies in other wetlands.

PB80-176258 PC **A22**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Proceedings: Symposium on Iron and Steel Pollution Abatement Technology (1st), Held at Chicago, Illinois on October 30-November 1, 1979.
Feb 80, 513p EPA-600/9-80-012
Contract EPA-68-02-2630

The symposium was organized into air, water, and solids sessions. Air pollution topics included: emission standards, assessment of coke quench tower and by-product recovery plant emissions, sealing of coke-oven doors, volatilization of hydrocarbons in steel rolling operations, development of a coke-oven air pollution control cost effectiveness model, control of sinter plant emissions utilizing recirculation of windbox gases, estimating fugitive contributions to ambient particulate levels near steel mills, foreign technology for BOF fugitive emission control, and fugitive particulate emission factors for BOF operations. Water topics included emission standards, total recycle of water in integrated steel mills, use of spent pickle liquor in municipal sewage treatment, physical/chemical treatment of steel plant wastewaters using mobile pilot units, foreign technology for controlling coke plant and blast furnace wastewaters, and formation and structure of water-formed scales. Solid waste topics included emission standards, environmental and resource conservation considerations of steel industry solid waste, and de-oiling and utilization of mill scale.

PB80-176282 PC **A12**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Structures Design.
Rigid Pipe Proof Testing Under Excess Overfills with Varying Backfill Parameters. Section V (Volume 7) - Neutral Point Analysis Output: Quasi-Theoretical Bending Moments, with Experimental Moments,
R. E. Davis, F. M. Semans, D. W. Spannagel, and A. E. Bacher. Feb 79, 265p FHWA/CA/SD-79/09
See also Section 5, Volume 8, PB80-171259.Color illustrations reproduced in black and white.

The neutral point analysis described in SECTION V (Volume 1) was employed to determine quasi-theoretical bending moments in the walls of the Cross Canyon reinforced concrete culvert, using normal and tangential tractions modified to satisfy equilibrium considerations. Experimental values of bending moment, determined from internal strain gages, are included for comparison.

PB80-176290 PC **A15**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Structures Design.
Rigid Pipe Proof Testing Under Excess Overfills with Varying Backfill Parameters: Section VIII - Analysis of Distress. Part 1 (with Appendices A through E),
R. E. Davis, F. M. Semans, D. W. Spannagel, and A. E. Bacher. May 79, 347p FHWA/CA/SD-79/13
See also Section 5 (Volume 7), PB80-176282 and Section 2, Part 1, PB80-166390.

Structural behavior of the reinforced concrete pipe culvert at Cross Canyon is evaluated on the basis of chronological observations of distress. Cracking patterns at successive overfills were recorded by mapping (sketching) and photographically, and diameter changes were assessed from extensometer readings. Records of significant crack widths were tabulated and are discussed in project diaries. These data are compiled in this section of the project report. The behavior of the various zones comprising the pipe is compared by ranking the zones on the basis of distress exhibited. Explanations of behavior are provided, based on observed soil stress profiles and neutral point analyses based thereupon. Zones with low modulus inclusions (induced trench, Method B backfill) exhibited superior performance at the higher overfills but not at the lower ones. A plot of permissible overfills for various pipe strengths, based on first appearance of 'industry-defined' failure or delamination, is furnished for the entrenched zones with ordinary (Method A) backfill.

PB80-176308 PC **A05**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Structures Design.
Rigid Pipe Proof Testing Under Excess Overfills with Varying Backfill Parameters. Section IX: Analysis of Costs,
R. E. Davis, F. M. Semans, D. W. Spannagel, and A. E. Bacher. Nov 79, 91p FHWA/CA/SD-79/16
See also Section 8, Part 1, PB80-176290 and Section 5, Volume 4, PB80-166432.

An analysis is made of costs, based on bid item prices of ten zones of the dummy culvert and one zone in the functional, prestressed concrete pipe culvert at Cross Canyon. Costs per linear foot (meter) were as follows in order of economy: (1) Zone 2: $152.08 ($498.81); (2) Zone 4: $163.42 ($536.02); (3) Zone 1: $164.86 ($540.79); (4) Zone 3: $168.29 ($551.99); (5) Zone 9: $171.75 ($563.35); (6) Zone 5: $173.42 ($568.82); (7) Zone 8: $184.44 ($604.95); (8) Zone 6: $188.42 ($618.02); (9) Zone 10: $193.01 ($633.07); (10) Zone 7: $209.26 ($686.43); (11) Zone 11: $443.16 ($1617.56). Zones 1 (steel struts), 2 (timber struts) and 3 (cement-treated bedding) were economical but are not recommended for reasons discussed in Section I. Zones 4, 5, 6 and 7 (variable strength) ranked economically in the same order as their strengths. Zones 9,8, and 10 (low modulus inclusions) ranked in economy as they did structurally. Zone 11 (the prestressed pipe), if the same diameter, would have cost $321 per linear foot more than Zone 9, indicating a potential saving of $339,000 on this project alone.

PB80-176555 PC **A02**/MF **A01**
Geological Survey, Indianapolis, IN. Water Resources Div.

Geohydrologic Setting of and Seepage from a Water-Supply Canal, Indianapolis, Marion County, Indiana.
Water-Resources investigations (Final),
William Meyer. Nov 79, 23p USGS/WRD/WRI-80/019, USGS/WRI-79-115
Prepared in cooperation with Indiana State Dept. of Natural Resources, Indianapolis.

The water level in the canal on July 21, 1978, was above the water table along the entire reach of the canal upstream from the Fall Creek aqueduct, which precluded the discharge of ground water into the canal. If the canal sides and bottom can be assumed to be permeable, then water can be assumed to be seeping downward from the canal into the deposits along the entire reach. Because of the highly variable lithology in the alluvial and outwash deposits underlying the canal, the seepage rate is probably also highly variable. Discharge was measured at selected points along the canal, and differences between successive measurements were calculated to determine the rate of water loss. The rate of seepage from the canal would be greater for stages and water temperatures higher than those at the time of the study and would be lower for stages and water temperatures lower than those at the time of the study.

PB80-176639 PC **A04/MF A01**
Texas Univ. at Austin. Center for Research in Water Resources.
Optimizing Flood Operation Rules.
Technical rept.,
Leo R. Beard, and Shin Chang. Nov 79, 51p
CRWR-166, W80-04501, OWRT-B-182-TEX(1)

Stochastic dynamic programming was used to formulate flood-control reservoir operation rules with provisions for traditional considerations, flood-warning time, and damage increase due to flooding duration. Since future inflows into a given reservoir are not known, all floods of record that followed each classification of system state were taken as representative of all floods to follow that class of system state. The three dimensions of system state are initial reservoir storage, current inflow, and rate of change of inflow. A discussion of dynamic programming formulation for the least-expected-damage reservoir release policy is given along with the traditional release rule. These are coded in the program UTFCO-University of Texas Flood Control Operations.

PB80-177595 PC **A99/MF A01**
Environmental Protection Agency, Cincinnati, OH. Office of Research and Development.
Proceedings of United States/Japan Conference on Sewage Treatment Technology (6th) Held at Cincinnati, Ohio on October 30-31, 1978, and Washington, DC. on November 2-3, 1978.
Dec 79, 677p EPA-600/9-79-039

As part of joint interests in environmental matters between the United States and Japan, a Conference on Sewage Treatment Technology is held at intervals of about 18 months. This publication contains papers from the Japanese group and from the American side that were presented at the Sixth Conference. Subject matter covered included nitrogen removal, sludge processing, instrumentation, sewage plant construction and water quality.

PB80-177942 PC **A14/MF A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
Energy/Environment IV: Proceedings of the National Conference on the Interagency Energy/Environment R and D Program (4th) Held at Washington, DC on June 7-8, 1979.
Decision series,
Francine S. Jacoff, Elinor Voris, and Gary M. Sitek. Oct 79, 311p EPA-600/9-79-040
Contract EPA-68-01-2934
See also PB-290 558.Color illustrations reproduced in black and white.

Energy/Environment IV provides an update of interagency reseach programs in particular areas, including health effects, transport processes and ecological effects, mining methods and reclamation, control technology and integrated technology assessment. Complete texts of all papers are presented, along with addresses, panel discussions, and question and answer periods. The volume is illustrated with tables and figures.

PB80-180144 PC **A02**
North Carolina State Univ. at Raleigh. Sea Grant Coll. Program.
Transplanting Coastal Dune and Marsh Grasses.
Stephen W. Broome. 1978, 4p UNC-SG-R-145, NOAA-80032813
Pub. in Agronomy Review, North Carolina State University, Dept. of Soil Science, p18-20 1978.

With increased attention to the coastal zone, there is a growing interest in repair, management, restoration and construction of dunes. The most successful and economical method of building dunes where blowing sand is available is transplanting dune grasses which trap sand and begin the natural cycle of dune growth. The use of marsh grasses to control shoreline erosion in sounds and rivers is a relatively recent development. Shoreline erosion occurs throughout most of the estuarine area of North Carolina. Experimental plantings of salt marsh grasses have demonstrated that establishing a protective fringe of marsh on an eroding shoreline is a practical erosion control method. The marsh fringe acts as a damper on waves, hold the soil in place and actually traps sediments to build up the shore. The newly established marsh also becomes an important component of the surrounding waters, providing shelter, food and nutrients to marine organisms. The salt marsh grasses Spartina alterniflora (smooth cordgrass) and Spartina patens (salt-meadow cordgrass) have been most effective in shoreline plantings. While not always successful, marsh grasses can be established at a fraction of the cost of bulkheading.

PB80-180177 PC **A02**
University of Southern California, Los Angeles. Inst. for Marine and Coastal Studies.
Potential Sand and Gravel Resources in Santa Monica and San Pedro Bays: Southern California.
R. H. Osborne, R. C. Scheidemann, Jr., T. R. Nardin, A. S. Harper, and K. L. Brodersen.
c1977, 11p USC-SG-R-07-79, NOAA-80040402
Pub. in Proceedings of Oceans, September 1979, p590-597 Dec 79.

Sand and gravel are primary resources used in many phases of construction and to maintain southern California's invaluable beaches and harbors. Deposits of saleable-grade material under present political and economic conditions are rapidly becoming depleted. Many land-based deposits are lost to competing land use, and mining of such deposits is generally opposed by urban communities. Offshore sand and gravel deposits in Santa Monica and San Pedro Bays offer a possible alternative to mining land-based deposits for beach nourishment and construction materials.

PB80-180243 CP **T02**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
Standard Codes for Named Populated Places and Related Entities of the States of the United States.
Data file,
Josephine L. Walkowicz. 25 Apr 80, mag tape NBS/DF-80/001
Supersedes Rept. no. NBS/DF-77/009B, PB-274 150.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The report presents information that users will need to process the data file in this first update of the magnetic tape version of document NBS-FIPS-55, 'Codes for Named Populated Places and Related Entities of the States of the United States'. This update incorporates the changes and additions to the file as published in Change Notices 1, 2, 3 and 5; it also includes a 2-character class code field. NBS plans for modification of the class code structure are discussed. Physical and logical record characteristics are presented.

PB80-180680 PC **A14/MF A01**
California Univ., Berkeley. Inst. of Transportation Studies.
Proceedings of the International Symposium on Traffic Control Systems Held at Berkeley, California on August 6-9, 1979. Volume 2A: Keynote Addresses; Concepts and Strategies.
Dec 79, 320p UCB-ITS-P-79-4
See also Volume 1, PB80-105091, and Volume 2B, PB80-180698. Sponsored in part by Federal Highway Administration, Washington, DC. Also pub. as ISSN-0192-4117.

Contents: A local traffic control policy which automatically maximizes the overall travel capacity of an urban road network; Capacity and timing calculation methods for signalized intersections; A new method of traffic-responsive control of traffic signals; Algorithms for the computer control of urban traffic; Assessment by observation and by simulation studies of the interest of different methods of bus preemption at traffic lights; Strategic concepts in residential neighborhood traffic control; A systematic approach to the derivation of driver information requirements in work zones; Current research in planning work zone traffic control; Advance treatment of no-passing zones for safety; Strategies and effectiveness of traffic control systems on freeways in the Federal Republic of Germany; Self-sufficient control of speed on freeways; Reducing travel time by freeway ramp metering especially when peak traffic demand exceeds corridor capacity; Automatic incident detection; and Incident detection in Europe.

PB80-180698 PC **A14/MF A01**
California Univ., Berkeley. Inst. of Transportation Studies.
Proceedings of the International Symposium on Traffic Control Systems Held at Berkeley, California on August 6-9, 1979. Volume 2B: Control Equipment.
Dec 79, 312p UCB-ITS-P-79-5
See also Volume 2A, PB80-180680, and Volume 2C, PB80-180706. Sponsored in part by Federal Highway Administration, Washington, DC. Also pub. as ISSN-0192-4117.

Contents: The Northeast New Jersey route guidance; S.C.A.T. The Sydney co-ordinated adaptive traffic system - philosophy and benefits; Hampton roads traffic surveillance and control system; Signal systems without cables; On-line vehicle classification; An in-vehicle information system for drivers; The integrated motorist information system--an examination of three tradeoff studies; Highway advisory radio; The use of a CB radio-to-telephone interconnect for motorist aid communications; A sensor for control of arterials and networks; Function, equipment and field testing of a route guidance and information system for drivers; Automatic vehicle identification--tests and applications in the late 1970s; Transit vehicle fleet information and on-line management; and Automatic vehicle monitoring--a tool for vehicle fleet operations.

PB80-180706 PC **A11/MF A01**
California Univ., Berkeley. Inst. of Transportation Studies.
Proceedings of the International Symposium on Traffic Control Systems Held at Berkeley, California on August 6-9, 1979. Volume 2C: Driver Communication and Information.
Dec 79, 244p UCB-ITS-P-79-6
See also Volume 2B, PB80-180698, and Volume 2D, PB80-180714. Sponsored in part by Federal Highway Administration, Washington, DC. Also pub. as ISSN-0192-4117.

Contents: A simulator study of driver reaction to metric speed signs; A highway guide sign evaluation method; Toward more efficient low volume intersection control; Requirements of drivers and road operational services concerning road information; Evolution and use of hazard warning signs on the New Jersey Turnpike; Advance warning at railroad grade crossings; The effectiveness of regulatory school flashers in reducing vehicle speeds; Effectiveness of speed control signs in rural school zones and small communities; Evaluation of a rural motorist information and diversion system; An aspect of the determination of the most useful real-time traffic condition information for urban motorway users; Traffic guidance and information

systems for motorway networks--strategy and application; and Development of a dynamic changeable message sign system for freeway-to-freeway diversion.

PB80-180714 PC **A13**/MF **A01**
California Univ., Berkeley. Inst. of Transportation Studies.
Proceedings of the International Symposium on Traffic Control Systems Held at Berkeley, California on August 6-9, 1979. Volume 2D: Analysis and Evaluation; Present and Future Considerations of Interactions between Automobiles and Traffic Control Systems.
Dec 79, 278p UCB-ITS-P-79-7
See also Volume 2C, PB80-180706. Sponsored in part by Federal Highway Administration, Washington, DC. Also pub. as ISSN-0192-4117.

Contents: Measures of effectiveness for urban traffic management; Capacity and quality of flow on urban arterials; Traffic data collection system for the Belgian motorway network - measures of effectiveness aspects; Effectiveness of freeway traffic control systems with respect to environmental protection; Simulation and assignment of traffic in urban road networks; A microscopic discrete-event time-oriented traffic simulation model for a two-lane highway network; Assessment of integrated traffic control systems in downtown areas by a complex simulation model; A simulation model for signalized intersections; Computer-aided design and evaluation of traffic systems; Scope and limitations of analytical models in optimising traffic control in urban streets; Development of a dynamic traffic assignment model of urban street networks; Route choice and traffic control in central urban areas; The comprehensive automobile traffic control system--a look at the future; Interactions between automobiles and traffic control systems; On-board logic for interaction with traffic control systems; and criteria for planning interactive traffic control systems.

PB80-181472 PC **A06**/MF **A01**
Monsanto Research Corp., Dayton, OH.
Source Assessment: Prescribed Burning, State of the Art.
Final rept. Aug 75-Sep 79,
C. T. Chi, D. A. Horn, R. B. Reznik, J. M. Pierovich, and L. G. Lavdas. Nov 79, 122p MRC-DA-931, EPA-600/2-79-019H
Contract EPA-68-02-1874
Sponsored in part by Forest Service, Washington, DC.

This report summarizes reported data on air emissions from prescribed burning, which is defined as the skillful application of fire in forest and range management under conditions that will confine the fire to a predetermined area and accomplish certain planned benefits. Prescribed fire is used on a seasonal basis in all regions of the United States.

PB80-181480 PC **A09**/MF **A01**
Chalmers Univ. of Technology, Goeteborg (Sweden). Institutionen foer Vattenbyggnad.
Description and Validation of the CTH-Urban Runoff Model,
Viktor Arnell. 1980, 192p SER-A-5
Also pub. as ISSN-0348-1050.

The report describes the structure, function, and validation of the CTH-Urban Runoff Model. It is a design/analysis model and includes the processes of infiltration, surface depression storage, overland flow, gutter flow, pipe flow, and retention storage. Infiltration is calculated by Horton's equation and depression storage supply is calculated by an exponential relationship. Overland flow and pipe flow are calculated according to a kinematic wave theory and the outflow from the retention basin is a function of the water depth in the basin. The CTH-Model was validated by simulation of the runoff for 10-20 measured rainfalls in each of six urban residential areas.

PB80-181662 PC **A04**/MF **A01**
Wisconsin Univ.-Madison. Sea Grant Coll. Program.
The Invisible Menace--Contaminants in the Great Lakes.
Annual rept.,
Christine Kohler, Whitney Gould, and Warren Downs. Mar 80, 66p WIS-SG-80-133, NOAA-80041107

The primary mission of the University of Wisconsin Sea Grant College Program is to explore the potentials of and seek solutions to the problems of the Great Lakes and other marine resources. This overview of Sea Grant achievements during the past three years gives special attention to the activities related to toxic substances. Sea Grant's many other programs and research projects--ranging from aquaculture and policy studies to diving physiology and ocean engineering--are profiled later in this report.

PB80-182314 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Soil Classification for Construction Practice in Shallow Trenching.
Building science series (Final),
Felix Y. Yokel, Richard L. Tucker, and Lymon C. Reese. Mar 80, 92p NBS-BSS-121
Sponsored in part by Occupational Safety and Health Administration, Washington, DC., and National Inst. for Occupational Safety and Health, Rockville, MD. Library of Congress catalog card no. 80-600014.

Construction practices in trenching and data on potential causes of trenching accidents are reviewed. A study is made of the soil properties and site conditions that must be identified in order to determine the stability of shored and sloped excavations against cave-ins. Two possible alternate soil classification methods are recommended. The methods are simple enough to be used by construction foreman and at the same time use parameters which can be measured or identified without ambiguity. The classification methods are supplemented by appropriate field tests and correlated with allowable side slopes and lateral soil pressures on shoring.

PB80-182686 PC **A04**/MF **A01**
Illinois Univ. at Chicago Circle. School of Urban Science.
Moving People: The Case for Public Transportation.
Final rept. Sep 78-Jan 80,
Claire McKnight, and Christine Johnson. Jan 80, 60p UMTA-IL-11-0025-80-1

The report is a Handbook on public transportation for the general public. The issues that it covers include: transportation planning; transportation costs and financing; user benefits of public transportation; social benefits of public transportation; public perceptions of public transportation; and marketing of public transportation. The purpose of this Handbook is to explain how public transportation is planned, how the individual citizen can make his views heard, why subsidies are necessary, and finally, what is being done to improve public transportation. These issues are explored in a question and answer format and several case studies are included to illustrate complex issues and explore topics in greater detail.

PB80-182694 PC **A12**/MF **A01**
SCS Engineers, Reston, VA.
Small-Scale and Low-Technology Resource Recovery Study.
Final rept.,
Gary L. Mitchell, Charles Peterson, Esther R. Bowring, and Brian West. Dec 79, 266p EPA-600/2-79-099
Contract EPA-68-03-2653

A study was conducted to assess the applicability of various approaches to resource recovery to selected waste generators. The resource recovery systems and technologies were limited to those operating in the small-scale range, defined as less than 100 tons per day input, or those approaches considered to be low technology, defined as having more than 50 percent of operation and maintenance costs associated with labor, i.e., labor intensive. The generators included institutions, commercial sources, office building complexes, multi-unit residences and small cities.

PB80-182975 PC **A08**/MF **A01**
Water Resources Council, Washington, DC.
State of the States: Water Resources Planning and Management.
Apr 80, 159p
Prepared in cooperation with Harbridge House, Inc., Washington, DC.

The purpose of this document is to take stock of water resources planning and management trends at State and regional levels, as well as those water resources/administration issues that confront State and regional efforts. It provides an overview of State quantity and quality planning and management activities and summarizes the current status of State water quality planning, regulation, standard setting, wastewater facility construction, and other management activities. Finally, it deals with identification of significant locations and conditions surrounding current or potential water resources problems.

PB80-183825 PC **A08**/MF **A01**
Beak Consultants, Inc., Portland OR.
Biological Impacts of Minor Shoreline Structures on the Coastal Environment: State of the Art Review. Volume I,
E. L. Mulvihill, C. A. Francisco, J. B. Glad, K. B. Kaster, and R. E. Wilson. Mar 80, 168p FWS/OBS-77/51
Contract DI-14-16-0008-2153

The types of structures included in this study were as follows: breakwaters, jetties, groins, bulkheads, revetments, ramps, piers and other support structures, buoys and floating platforms, harbors for small craft, bridges and causeways. Information was extracted from the literature and compiled by type of shoreline structure and by Coastal region. Existing information was evaluated and a text was prepared (Volume I). An annotated bibliography, keyword index, and primary author reference number index were produced from the data base (Volume II). Structures which appear to have the greatest potential for impacting the coastal environment are small boat harbors, bridges and causeways, bulkheads, breakwaters, and jetties. Those with moderate impact potential are revetments, groins, and ramps. Low-impact potential structures include buoys and floating platforms, and piers, pilings and other support structures. Based on this classification scheme and the number and types of information sources located, bridges, causeways, and small boat harbors have received very little study relative to their potential impacts.

PB80-183940 PC **A02**
Woods Hole Oceanographic Institution, MA.
Diversity as an Indicator of Pollution: Cautionary Results from Microcosm Experiments,
Woollcott Smith, Victoria R. Gibson, L. Susan Brown-Leger, and J. Frederick Grassle. c1979, 15p NOAA-80040705
Grants NOAA-04-8-M01-149, NSF-OCE77-27448
Pub. in Ecological Diversity in Theory and Practice, Statistical Ecology Series, v6 p269-277 1979.

Data from two microcosm experiments (CEPEX and MERL) are examined to determine whether diversity measures can provide an appropriate indicator of environmental stress. It is concluded that diversity is a rather stable community parameter, relatively insensitive to both natural variation and pollution over the short-term. When a community is not in stationary equilibrium with its environment, it appears that changes in species composition and density are a more reliable indicator of stress than diversity measures. (Copyright (c) 1979, by International Co-operative Publishing House.)

PB80-184351 PC **A02**/MF **A01**
New York State Coll. of Agriculture and Life Sciences, Ithaca.
Oil Spills: A Public Official's Handbook,
John T. Omohundro. Mar 80, 22p IB-166, SSSG-3, NOAA-80042207
See also PB80-183585.

This handbook explains the social response to an oil or hazardous substance spill, particularly in water. The reactions of the victims and coastal residents of the impacted area are identified, and actions that may reduce social problems are suggested. The last section, 'Suggestions for Planning and Response,' may be consulted immediately in the event of a spill. An emergency checklist on the back cover addresses specific actions and guides the reader to appropriate sections of this handbook. The quick reference charts 1, 2, and 3 may

serve as memory aids to the social context of particular problems. Officials should find this handbook useful in preparing for public meetings and news conferences, in conducting personal interviews while reconnoitering or administering in the impacted area, and in handling telephone and written requests for information or help.

PB80-184518 PC **A24/MF A01**
Office of Technology Assessment, Washington, DC.
The Direct Use of Coal. Volume II-Part A: Working Papers. Appendices I thru VI.
Nov 79, 560p OTA-E-86A
See also Volume 1, PB-295 797 and Volume 2, Part B, PB80-184526.

The contents include: (1) Selection topics in estimating future energy demand and supply, (2) rethinking the scale of coal-fired electric generation: technological and institutional considerations, (3) Residential and commercial uses of coal, (4) Coal cleaning and desulfurization, (5) Direct utilization of coal: flue gas desulfurization, and (6) Miners and operators collective bargaining in coal.

PB80-184526 PC **A99/MF A01**
Office of Technology Assessment, Washington, DC.
The Direct Use of Coal. Volume II-Part B: Working Papers. Appendices VII thru IX.
Dec 79, 607p OTA-E-86B
See also Volume 1, PB-295 797; Volume 2, Part A, PB80-184518, and Volume 2, Part C, PB80-184534.Color illustrations reproduced in black and white.

The contents include: (1) Environmental considerations for increased coal utilization; (2) Transport and fate of sulfur and other air pollutions; (3) Prediction and review of air pollution health effects from direct coal combustion.

PB80-184534 PC **A23/MF A01**
Office of Technology Assessment, Washington, DC.
The Direct Use of Coal. Volume II-Part C: Working Papers. Appendices X thru XIV.
Dec 79, 542p OTA-E-86C
See also Volume 1, PB-295 797; Volume 2, Part B, PB80-184526, and Volume 2, Part D, PB80-184542.

The contents include: (1) Effects on plants of sulfur pollutants from coal combustions; (2) Coal mine health; (3) Social and economic impacts of coal production in the Eastern United States; (4) Impacts of coal development of Western communities; and (5) Public attitudes toward coal-fired power plants.

PB80-184542 PC **A18/MF A01**
Office of Technology Assessment, Washington, DC.
The Direct Use of Coal. Volume II-Part D: Working Papers. Appendices XV thru XVII.
Dec 79, 425p OTA-E-86D
See also Volume 1, PB-295 797, and Volume 2, Part C, PB80-184534.

The contents include: (1) Federal coal leasing policy: a status report; (2) Law applicable to air emissions from direct use of coal; (3) Surface Mining Control and Reclamation Act of 1977.

PNL-SA-7556 PC **A02/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
How the Air Cleans Itself.
J. M. Hales. Feb 79, 25p CONF-7905133-1
Contract EY-76-C-06-1830
SCI sulphur symposium, London, UK, May 1979.

The various mechanisms for atmospheric recovery are discussed, and means by which these pathways can be treated mathematically to formulate models of air quality and pollutant behavior are described. Many of the essentials of atmospheric recovery processes are outlined. The important problems currently at the forefront of wet- and dry-deposition research are also discussed. (ERA citation 05:016474)

PNL-2802 PC **A05/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Cost of Meeting Geothermal Hydrogen Sulfide Emission Regulations.
K. D. Wells, J. W. Currie, S. A. Weakley, and M. Y. Ballinger. Jan 80, 93p
Contract EY-76-C-06-1830

H sub 2 S emission abatement processes considered feasible for control of airborne emissions included two upstream and two downstream treatment techniques. From literature describing the technical aspects of the processes, individual treatment cost functions were developed. These functions were then used to estimate the range of costs that may be encountered when controlling H sub 2 S emissions to meet given standards. Treatment costs include estimates of certain fixed charges and overheads that normally apply to long lived capital investment projects of similar nature. Continuing experience with control technology for H sub 2 S abatement indicates process application may have a significant impact on the total cost of geothermal electricity at sites with H sub 2 S concentrations in excess of 50 ppM/sub w/. Approximately four sites of the 38 USGS high temperature hydrothermal systems fall into this category. At Baca, New Mexico the cost of controlling H sub 2 S emissions was estimated to be 5.5 mills per kWh. Calculations were based on a 50 MWe flashed steam plant using the Stretford-Peroxide combination of processes to achieve 99% abatement. (ERA citation 05:015558)

UCRL-52899 PC **A02/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
ASCOT FY-1979 Progress Report.
M. H. Dickerson, and P. H. Gudiksen. Jan 80, 10p
Contract W-7405-ENG-48

The organization and accomplishments of the DOE program for Atmospheric Studies in Complex Terrain (ASCOT) for FY-1979 are described. ASCOT is currently concentrating on the study of nighttime drain winds in The Geysers area of Northern California. The ASCOT program is designed to develop the technology needed to assess atmospheric properties and the impact of new energy sources on air quality in areas of complex terrain. The program uses theoretical atmospheric physics research, mathematical models, field experiments, and physical models to help develop a modeling and measurement methodology that can be used to provide the air quality assessments in these areas. Progress in these research projects is reviewed briefly. (ERA citation 05:016477)

13C. Construction Equipment Materials, and Supplies

3NL-51100 PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
Encapsulation of Phase Change Materials in Concrete Masonry Construction. Progress Report No. 3, June 1978-September 1978. Final Report.
M. J. Sansone. 1978, 25p
Contract EY-76-C-02-0016

Work performed at Brookhaven National Laboratory on Union Carbide Nuclear Division, ORNL contract number 19Y-14279V, Encapsulation of Phase Change Materials (PCM) in Concrete Masonry Construction, is summarized. Due to program termination, the report also constitutes the final report of the program. Thermal analysis of the system Na sub 2 CO sub 3 .10H sub 2 O has shown that after separation upon melting, the heat of fusion is considerably higher than Na sub 2 SO sub 4 .10H sub 2 O. The system NaCO sub 3 -K sub 2 CO sub 3 -H sub 2 O has been found to be unsuitable for PCM use. A eutectic in the MgCl sub 2 -CaCl sub 2 -H sub 2 O is under consideration. It exhibits a high heat of fusion and low transition temperature range. Cylindrical shells have been cast using polymer concrete. The shells were subsequently filled with PCM and thermally cycled. No leaking of PCM occurred. Thermal measurements on PCM composite materials were continued. (ERA citation 05:012071)

PB80-170848 PC **A03/MF A01**
National Bureau of Standards, Washington, DC.
Measuring the Rate of Corrosion of Reinforcing Steel in Concrete.
Annual rept.,
E. Escalante, S. Ito, and M. Cohen. Mar 80, 45p NBSIR-80-2012
Sponsored in part by Federal Highway Administration, Washington, DC.

The progress on a research program directed at developing a nondestructive method for measuring the corrosion of steel in concrete as related to bridge deck deterioration is reported. Several polarization techniques for measuring the corrosion rate of steel in concrete are correlated to actual weight loss measured gravimetrically. The design of a prototype automated minicomputer system for measuring the corrosion of steel in concrete is also described. Included are the results of a laboratory basic study on the effect of pH, Cl-, O sub 2, and moisture on initiating and maintaining corrosion in mortar.

PB80-175110 PC **A07/MF A01**
JACA Corp., Fort Washington, DC.
Techniques for Automatic Aggregate Gradation.
Final rept. Aug 77-Oct 79,
Robert C. Bedick, Uday Patankar, and James A. Commins. Feb 80, 147p FHWA/RD-79-118
Contract DOT-FH-11-9308

This study focuses on an evaluation of techniques for automatic gradation applicable to mineral aggregate used in highway construction. The impetus for this study was the need for improved, rapid information on aggregate gradation for process control and to facilitate producer certification of highway aggregate. Potential techniques were identified after an extensive search of methods and concepts for automatic particle sizing spanning a wide spectrum of industrial activity where such information is needed for quality or process control. An elimination process narrowed the field of potential sizing techniques to six which were subjected to rigorous study. Two of these six techniques were identified for development of a conceptual system design which included technique modification, system component identification, structural considerations, compatibility with existing plant equipment, system reliability analysis, cost estimates and analysis of technique limitations. Conclusions from this study are that while no commercially available technique meets all the industry specified criteria for automatic gradation, the two systems identified (the vidicon and the optical shadow technique) show promise of being viable in the long run. It is recommended that further work, including engineering model development and field testing be undertaken to improve the performance capability of these techniques, and that alternate gradation specifications based on other measures of particle size be developed to facilitate the inclusion of these techniques in the industry mainstream.

PB80-175672 PC **A06/MF A01**
National Materials Advisory Board, Washington, DC.
The Status of Cement and Concrete R and D in the United States.
Final rept.
1980, 117p NMAB-361
Contract MDA903-74-C-0617
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.

Data presented show that the level of research and development (R&D) in the cement and concrete industry in the United States is inadequate to meet current needs and future challenges. Specific areas of concern are identified, and various incentives for and barriers to R&D are discussed. Emphasis is placed on the need for a vigorous, coordinated basic research and development establishment (civilian, academic, and governmental) coupled with an efficient mechanism for technology transfer to commercial practice. This mature industry is moving slowly to enlarge and improve its physical plant and increase its production efficiency but is doing little to learn more about its products. Foreign developments are used as examples of what can be done with proper planning and adequate capital outlays. Recommendations are made where specific efforts are required for economic, institutional, and technological improvement. These include some nontechnical sugges-

tions, such as increasing governmental and industrial support for R&D and reexaming some of the barriers to R&D caused by legislative restraints on vertical integration and lack of tax incentives. Technical issues identified are the need for an interdisciplinary approach to experimental, theoretical, and modeling studies; an increase in studies of basic mechanisms of cement hydration and development of strength in concrete and in studies of long-term durability under extreme environments; and the efficient utilization of energy and resources by the industry. An independent research and development facility is suggested as one way to get the proper nucleus of people together to examine critically various industry-wide problems of immediate and long-range concern.

PB80-177389 PC **A05**/MF **A01**
Texas Tech Univ., Lubbock. Dept. of Civil Engineering.
Breakage Characteristics of Window Glass Subjected to Small Missile Impacts.
Master's thesis,
William Lynn Beason. Dec 74, 96p NSF/RA/E-74-565
Grant NSF-GK-34015

Experiments were performed to define the breakage characteristics of window glass when exposed to simulated windstorm conditions. Information learned from this study will be useful in designing window glass which can withstand breakage caused by the impact of small windborne missiles such as roof gravel. The research plan established breakage characteristics of two types of window glass and identified the relative significance of such parameters as surface area of the pane, uniform pressure, and mass of the missile. Factorial experiments were used to determine the relative significance of first and second order interactions of independent control variables. The report identifies and defines the research program and describes experimental analysis plans whereby appropriate statistical analyses are performed using laboratory data. Laboratory test facilities and procedures are described, and the results, recommendations, and conclusions are discussed.

PB80-810740 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Architectural Construction Materials. Non-Concrete. 1978-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Apr 80,
Guy E. Habercom, Jr. May 80, 156p
Supersedes NTIS/PS-79/0554 and NTIS/PS-78/0526. See also 1964-1974, NTIS/PS-76/0375 and 1975-1977, NTIS/PS-79/0553.

Non-concrete construction materials for architectural applications are investigated in these citations. Structural design and performance are reviewed. Reports concerned with concretes, bridges, pavements, airfields, cold weather construction, composites, and earthquake resistant construction have been excluded. (This updated bibliography contains 150 abstracts, 51 of which are new entries to the previous edition.)

PB80-810757 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Architectural Construction Materials: Concretes and Cements. June, 1976-April, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 76-Apr 80,
Guy E. Habercom, Jr. May 80, 316p
Supersedes NTIS/PS-79/0555 and NTIS/PS-78/0527. See also 1964-May, 1976, NTIS/PS-77/0468.

Concrete/cement construction materials for architectural applications are investigated in these research reports. Structural design and performance are reviewed. Studies for bridges, pavements, airfields, cold weather construction are excluded. (This updated bibliography contains 310 abstracts, 61 of which are new entries to the previous edition.)

13D. Containers and Packaging

N80-21724/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Emergency Relief Venting of the Infrared Telescope Liquid Helium Dewar.
E. W. Urban. Mar 80, 23p NASA-TM-78271

An analysis is made of the emergency relief venting of the liquid helium dewar of the Spacelab 2 infrared telescope experiment in the event of a massive failure of the dewar guard vacuum. Such a failure, resulting from a major accident, could cause rapid heating and pressurization of the liquid helium in the dewar and lead to relief venting through the emergency relief system. The heat input from an accident is estimated for various fluid conditions in the dewar and the relief process as it takes place through one or both of the emergency relief paths is considered. It is shown that under all reasonable circumstances the dewar will safely relieve itself, and the pressure will not exceed 85 percent of the proof pressure or 63 percent of the burst pressure.

13E. Couplings, Fittings, Fasteners, and Joints

DOE/TIC-11126 PC **A03**/MF **A01**
Argonne National Lab., IL.
Measured Residual Stresses in Type 304 Stainless Steel Piping Butt Weldments.
W. J. Shack, and W. A. Ellingson. 1980, 30p
Contract W-31-109-ENG-38

Residual-stress measurements on Type 304 stainless steel Schedule 80 4-, 10-, and 26 in. pipe weldments are presented. Both strain-guage and x-ray diffraction techniques have been used. The bulk of the measurements have been made on the inner surface, since these stress levels presumably control the intitiation of intergranular stress-corrosion cracking. Complete stress profiles have also been obtained through the thickness of the pipe wall, since the throughwall distribution controls the growth of a crack once it has initiated. (ERA citation 05:016143)

13F. Ground Transportation Equipment

CONF-791009-23 PC **A02**/MF **A01**
Argonne National Lab., IL.
Electric and Hybrid Vehicles in the Urban Future.
M. K. Singh, and M. J. Bernard, III. 1979, 11p
Contract W-31-109-ENG-38
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.

Electric and hybrid vehicles (EHVs) are under development which could provide an alternative to conventional vehicles in urban areas in the not-too-distant future. The purpose of this paper is to present basic EHV information to transportation energy planners and engineers. The paper outlines: (1) the market potential for EHVs (trucks, buses, and automobiles) based on the work of several research groups and on expected technological characteristics of EHVs; (2) an assessment of the impacts of EHVs on the urban structure and transport systems as well as urban enviromental systems; and (3) current programs designed to accelerate the utilization of EHVs. In the assessment 61 types of vehicles are characterized and set in five distinct market scenarios. The paper concludes that the potential for significant EHV markets by the year 2000 is high and an overall net benefit to urban areas will result. (ERA citation 05:012158)

CONF-800212-2 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Directions in Automotive Engine Research and Development.
G. Samuels. 1980, 36p
Contract W-7405-ENG-26
Annual energy conference and exhibition during National Engineers' week, Knoxville, TN, USA, 20 Feb 1980.

The advent of high fuel costs and automotive fuel economy and emission regulations has cast doubt on the economic superiority and even the technical feasibility of conventional spark ignition and diesel engines, and has opened the field to other concepts. The emission regulations and their effect on the design and efficiency of conventional engines are reviewed, the research and development effort to improve the performance of conventional engines and to develop advanced engines is discussed, and the current status of these engines is presented. (ERA citation 05:016102)

COO-50042-1 PC **A03**/MF **A01**
Maine Master Electric Products Co., Winterport.
Research and Development of Concept Leading to an Automotive Alternator with Significantly Improved Efficiency and Weight. Final Report, February 1, 1979-January 31, 1980.
R. C. Noddin. 5 Jan 80, 26p
Contract AC02-79CS50042

The goal in Phase 1 of the subject project was to achieve a 20 to 25% improvement in both output/pound and efficiency relative to control performance of a present-production Delco No. 1102848 alternator. This was to be achieved by substitution of redesign stator of equal or smaller weight and size and in a configuration leading to low cost and manufacturability. Analysis of bench tests on the subject alternator incorporating the redesigned stator reveals an output/pound improvement of 30% thereby exceeding the design goal, and an average efficiency improvement of 25% easily equalling, and at most points of the performance curve, exceeding the design goal. This was achieved in a design employing proven, low-cost, high volume manufacturing techniques. The redesigned stator also lends itself to direct interchangeability with stators in production alternators. Major improvements in the rotor remain to be made in weight, iron losses, and field copper losses. These needs will be addressed in Phase 2 of the subject project. For purposes of baseline comparison the same alternator parts will be employed insofar as possible as in Phase 1. Stator iron and winding refinements, heat runs, study of reactances, and practical tests should also be addressed as ancilary projects following Phase 2. (ERA citation 05:016114)

DOE/CS-0130 PC **A05**/MF **A01**
Department of Energy, Washington, DC. Office of Transportation Programs.
Electric and Hybrid Vehicle Program. 3RD Annual Report to Congress for FY 1979.
Jan 80, 93p

The Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976 (P.L. 94-413) seeks to reduce petroleum consumption by encouraging the introduction and use of EHV and of hybrid vehicles. This third annual repot to the US Congress on the EHV Program summarizes activities during FY 1979, describing ongoing efforts, and recommending legislative action to facilitate further progress. The number of vehicles committed to market demonstrations increased from more than 200 in FY 1978 to almost 800 and demonstration sites rose from 16 to 57. There was a modest increase of commercial interest and public awareness of the potential of EHV also was heightened. Summaries are reported on market demonstrations, incentives, research and development, product engineering, commercialization activities, and legislative recommendations. (ERA citation 05:013864)

N80-21754/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Parametric Tests of a Traction Drive Retrofitted to an Automotive Gas Turbine.
D. A. Rohn, S. H. Lowenthal, and N. E. Anderson. 1980, 21p NASA-TM-81457, AVRADCOM-TR-80-8
Contract EF-77-A-31-1011
Prepared in Cooperation with Army Aviation Research and Development Command, Cleveland, Ohio. Presented at the 5TH Intern. Automotive Propulsion Systems Symp., Dearborn, Mich., 14-18 Apr. 1980.

The results of a test program to retrofit a high performance fixed ratio Nasvytis Multirolier Traction Drive in place of a helical gear set to a gas turbine engine are presented. Parametric tests up to a maximum engine power turbine speed of 45,500 rpm and to a power level of 11 kW were conducted. Comparisons were made to similar drives that were parametrically tested on a back-to-back test

stand. The drive showed good compatibility with the gas turbine engine. Specific fuel consumption of the engine with the traction drive speed reducer installed was comparable to the original helical gearset equipped engine.

PB80-170657 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Evaluation of the Ram-Jet Device, a PCV Air Bleed.
Technical rept.,
Edward Anthony Barth. Jan 80, 14p EPA-AA-TAEB-80-10

The Environmental Protection Agency receives information about many systems which appear to offer potential for emission reduction or fuel economy improvement compared to conventional engines and vehicles. This report discusses EPA's evaluation of the Ram-Jet, a retrofit device marketed by Ed Almquist. It is designed to bleed in extra air to the engine by allowing ambient air to bypass the carburetor under high engine load conditions. The manufacturer claims the device reduces emission pollutants and improves fuel economy.

PB80-170830 PC **A03**/MF **A01**
Delaware Univ., Newark. Dept. of Civil Engineering.
An Improved Analysis for Thermal Track Buckling.
Research rept.,
Arnold D. Kerr. Oct 78, 39p CE-78-16
Grant NSF-ENG78-25433

In a previous analysis of track buckling by the author, a simplifying assumption was made that the axial resistance which the ballast exerts on the rail-tie structure is constant. In the present paper this assumption is dropped, by presenting the axial resistance as a bi-linear response, which agrees better with the corresponding test data over the entire range of axial displacements. The obtained analytical results were evaluated numerically for the track parameters currently in use and the results are compared with the results of previous analyses, in order to establish the effect of the introduced analytical improvement.

PB80-170970 PC **A07**/MF **A01**
Decision Group, Inc., McLean, VA.
An Investigation of Rail Rapid Transit Carbody Materials.
Technical rept.,
R. E. Morris, G. Black, and W. Scheirer. Mar 80, 143p UMTA-IT-06-0175-80-1
Contract DOT-UT-70043

The behavior of the three carbody materials commonly used in the United States, which are aluminum, low alloy high tensile steel, and stainless steel, is examined in this report and compared throughout the range of rapid transit and inter-city passenger rail service applications and operating environments in North America and Europe. Life cycle cost implications of each material in specific applications and environments were derived from a statistical analysis of the conditions of a representative, structured sample of 520 rapid railcars, which were selected for detailed, careful examination of the 21 critical points which together permit characterization of structural material behavior. The cars comprise a representative sample of carbody materials, construction techniques, operating environments, and years-in-service. A computer-input form was completed for each of the cars, making possible an intensive statistical analysis of the observed conditions and the collective experience of operators and carbuilders.

PB80-173867 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Evaluation of an Automobile Power and Deceleration Governor.
Technical rept.
Apr 74, 6p EPA-AA-TAEB-74-29

The Power and Deceleration Governor is a vacuum controlled throttle valve assembly installed between the carburetor and the engine intake manifold. The control mechanism of the device affects a carburetion cut-off during deceleration and limits throttling during acceleration. There are no parameter changes made to the engine's basic spark timing, idle CO setting, or idle rpm.

PB80-173925 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Idle Fuel Consumption in Passenger Cars.
Technical rept.
Jul 75, 11p EPA-AA-TAEB-75-29

The Environmental Protection Agency has received numerous requests for idle fuel consumption data. The purpose of this report is to provide data which can be used to calculate the energy impact of various actions taken to reduce vehicle time spent at idle. The conclusions drawn from the test data are necessarily of limited applicability. The data base includes only late model vehicles. A complete evaluation of the energy impact of actions taken to reduce vehicle idle time requires more vehicle models and a larger sample of these test vehicles than is included in the data base.

PB80-175193 PC **A04**/MF **A01**
Vought Corp., Dallas, TX.
AIRTRANS Urban Technology Program - Phase II. Volume 1: Control System Improvements.
Final rept.,
J. N. Beberstein, J. E. Robison, W. A. Scott, and D. F. Sellers. Oct 79, 63p UMTA-TX-06-0020-79-2
See also Volume 2, PB80-175201.

AIRTRANS, an Automated Guideway Transit (AGT) system built by the Vought Corporation, has provided transit service for passengers at the Dallas/Fort Worth Airport since January 1974. This successful deployment of AGT technology prompted the investigation of the extension of the technology. Independent assessments were made by the Transportation Systems Center and by Vought to determine what changes or improvements would be required to operate AIRTRANS in an urban application. The recommendations were: higher operating speeds; better passenger acceptance; reduced capital and operating costs; increased reliability; enhanced all-weather capability; and increased energy efficiency. The AUTP was structured into a two-phase program. Phase I was completed in 1977. The first phase covered the development and demonstration of the improvements necessary for higher speed operation, while maintaining or improving reliability, availability, cost, and performance characteristics of the overall system. Using Phase I as a building block, other recommendations for improvements in AIRTRANS for urban applications were addressed in Phase II. This volume describes the control system improvements incorporated in the P40 vehicle and the AIRTRANS supervisory data system software additions for dual block occupancy alarm features and P40 passenger vehicle identity. Under the control system improvements, the objectives have been to continue development of the longitudinal velocity control systems as embodied in a new third generation Vehicle Control and Electronics Unit; implement improved functional design features in the areas of data communications, directional reversability, dual side doors, automatic test and checkout capability, built-in manual control, slip/slide detection, supervisory data system software and improved entrainment capability. Significant progress in the AIRTRANS control system's area has been demonstrated in simulation, laboratory tests, and guideway evaluation.

PB80-175201 PC **A04**/MF **A01**
Vought Corp., Dallas, TX.
AIRTRANS Urban Technology Program - Phase II. Volume 2: Improved Passenger Communications.
Final rept.,
Richard S. Jacobsen, and Conrad M. Schultz. Oct 79, 54p UMTA-TX-06-0020-79-3
See also Volume 1, PB80-175193, and Volume 5, PB80-157704.

AIRTRANS, an Automated Guideway Transit (AGT) system built by the Vought Corporation, has provided transit service for passengers at the Dallas/Fort Worth Airport since January 1974. This successful deployment of AGT technology prompted the investigation of the extension of the technology. Independent assessments were made by the Transportation Systems Center and by Vought to determine what changes or improvements would be required to operate AIRTRANS in an urban application. The recommendations were: higher operating speeds; better passenger acceptance; reduced capital and operating costs; increased reliability; enhanced all-weather capability; and increased energy efficiency. The AUTP was structured into a two-phase program. Phase I was completed in 1977. The first phase covered the development and demonstration of the improvements necessary for higher speed operation, while maintaining or improving reliability, cost, and performance characteristics of the overall system. Using Phase I as a building block, other recommendations for improvements in AIRTRANS for urban applications were addressed in Phase II. This report, Volume 2, covers the Improved Passenger Communications Task activities of the Vought Corporation, during Phase II of the AIRTRANS AUTP. The primary objectives of the program were to design, build, and demonstrate: (1) an onboard television surveillance system; (2) a programmable audio-announcement unit; (3) a dynamic graphic system; and (4) a time-to-arrival display unit for passenger stations. All of these systems were built and successfully demonstrated as part of the operation of a prototype urban AGT vehicle in the Dallas/Fort Worth AIRTRANS system.

PB80-175300 PC **A09**/MF **A01**
Wisconsin Univ.-Madison. Engineering Experiment Station.
Flywheel Energy Management Systems for Improving the Fuel Economy of Motor Vehicles.
Final rept. 30 Jun 76-30 Jun 77,
N. H. Beachley, and A. A. Frank. Aug 79, 194p DOT/RSPA/DPB/50-79/1
Contract DOT-OS-60177

The goals of the research program have been: (1) to develop, analyze and compare CVT designs to minimize the friction losses and weight of an integrated flywheel powerplant package, (2) to provide preliminary designs of flywheel propulsion systems for automobiles and minibuses, (3) to study the economic feasibility of production, (4) to obtain additional operational experience and experimental data on the research flywheel vehicle built at the University. The experimental flywheel vehicle has demonstrated 32 mpg over the EPA-CVS Federal Urban Driving Cycle at an inertia weight of 2750 lb. Calculations based on experimental engine data indicate that federally-mandated emissions levels could be achieved with little degradation in fuel economy. The computer simulation programs developed have been verified by experiment.

PB80-175490 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Evaluation of a Nissan Fast Burn Engine System (NAPS-Z).
Technical rept.,
James M. Kranig. Jan 80, 48p EPA-AA-TAEB-80-9

The EPA is interested in new technological developments which will reduce exhaust emissions and improve fuel economy. Because the development of the Fast Burn Engine System (NAPS-Z) by the Nissan Motor Company, Ltd., appeared to be a new technological development, the EPA requested a vehicle for testing and evaluation at the Motor Vehicle Emission Laboratory in Ann Arbor. Nissan Motor Company, Ltd., agreed to provide a vehicle for evaluation and agreed that the test program would include a variety of test conditions to enable a complete evaluation of the vehicle characteristics. The engine concept is the result of development aimed at meeting 0.41, 3.4 and 1.0 grams per mile for HC, CO, and NOx, respectively, while improving fuel economy. The conclusions from the EPA evaluation of the NAPS-Z can be considered to be quantitatively valid only for the vehicle used. However, it is reasonable to extrapolate the results from the EPA test program to other vehicles in a directional manner. It is reasonable to suggest that similar results are likely to be achieved where a similar engine concept is applied to other types of vehicles.

PB80-175714 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.

The Effect of Ignition Timing Modifications on Emissions and Fuel Economy.
Technical rept.
Oct 75, 28p EPA-AA-TAEB-76-04

The Emission Control Technology Division of the Environmental Protection Agency is interested in engine control techniques that influence emissions and fuel economy. One engine parameter that is readily adjustable is basic ignition timing, and it was desired that data be collected on a variety of late model (1975) vehicles to quantify its effect. Data from such a program would be useful in studies of inventor devices which occasionally include timing adjustments as part of the instaliation instructions, in tampering studies where investigations are made of the effect of emission control system modification, and in octane requirement problem investigations because of the influence of ignition timing on octane requirements.

PB80-175995 PC **A04**/MF **A01**
Wyle Labs., Colorado Springs, CO. Scientific Services and Systems Group.
Truck Design Optimization (TDOP), Phase II Analysis Plan.
Rept. for Mar 78-Oct 79,
Larry L. Johnson, and Arnold J. Gilchrist. Mar 80, 62p TDOP/TR-04, FRA/ORD-80/31
Contract DOT-FR-742-4277
See also report for Oct 78-May 79, PB80-104888.

The purpose of this document is to set forth the Analysis Plan which will be followed in the Truck Design Optimization Project (TDOP) Phase II. The Analysis Plan defines the means by which Type I (standard) and Type II (premium) freight car trucks will be characterized and compared. The specific objectives of the analysis task are: (1) to define the requirements for test data and simulation results which will establish performance specifications; (2) to determine the extent to which field test data can be extrapolated; and (3) to develop criteria for validating analytical models. The evaluation of Type I and Type II trucks addresses four important aspects of performance relating to railroad safety or effectiveness. The four are: lateral stability, trackability, curve negotiation, and ride quality. The Analysis Plan is divided into sections relating to each of the four performance regimes. Each section contains a discussion of performance indices, analysis requirements, model utilization, test data utilization, special considerations for Type II trucks, and summary.

PB80-176191 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Test and Evaluation Branch.
Evaluation of the Owens-Illinois Toroidal Ceramic Reactor.
Technical rept.,
Henry L. Gompf. Jun 72, 6p EPA-AA-TAEB-72-26

Representatives of Owens-Illinois, Inc. contacted the Test and Evaluation Branch of the Environmental Protection Agency to request a brief evaluation of a vehicle equipped with ceramic toroidal reactors of their design. As reactors of this type will be evaluated in the studies being conducted by NASA on ceramic reactors, a test program was initiated. This report describes the test program and presents the test results and conclusions.

PB80-176266 PC **A12**/MF **A01**
Clemson Univ., SC. Dept. of Mechanical Engineering.
Users' Manual for Lateral Stability Computer Programs for Railway Freight Car Models.
Interim technical rept.,
I. Hague, and N. K. Cooperrider. Apr 80, 254p FRA/ORD-80/30
Contract DOT-OS-40018
Prepared in cooperation with Arizona State Univ., Tempe. Dept. of Mechanical Engineering.

The dynamic performance of a rail vehicle is characterized by its curving behavior, vibration response and stability. The stability of a linear system can be studied by such classical methods as eigenvalue/eigenvector analysis. This report is a Users' Manual for four programs written in Fortran IV that use the eigenvalue/eigenvector analysis to determine the lateral stability of the 9, 17, 19, and 23 degree of freedom linearized models of the North American Freight Car. The program input, output, and the subroutines used are described herein and the results are in the form of printout. The manual includes program listings, sample deck setups and sample run outputs.

PB80-176274 PC **A20**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
Noncontacting Suspension and Propulsion for Ground Transportation.
Final rept.,
D. N. Wormley, H. H. Richardson, J. K. Hedrick, D. A. Limbert, and D. Mercaldi. Dec 79, 461p DOT/RSPA/DPB/50-79/34
Contract DOT-OS-60135

A research program has been conducted: (1) to assess critically the technological base available for evaluation of noncontacting vehicle suspension and propulsion systems in urban and intercity transport systems and (2) to develop analytical and experimental performance data for two specific systems - attractive, ferromagnetic suspension systems and air cushion suspension systems.

13G. Hydraulic and Pneumatic Equipment

AD-A083 197/4 PC **A05**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Investigation of the Scroll Mechanism for Pumping Hydraulic Fluid.
Final rept.,
Thomas W. Bein, and Mark A. Bergman. Mar 80, 79p Rept no. DTNSRDC-80/031

Two 3000-psi (20,700,000 Pa) hydraulic pumps, designed using the principles of the scroll mechanism, were built and evaluated to determine their feasibility for future shipboard hydraulic service. This report presents the geometry, mathematical models, and machining techniques required to fabricate these prototypes. The first-generation pump demonstrated a 95 percent volumetric efficiency at 500 psi (3,400,000 Pa), while the improved synchronously rotating drive mechanism of the second-generation unit eliminated the vibration and balance problems of the first-generation orbiting drive arrangement. This report also presents recommendations for follow-on scroll pump work. However, based on the results to date, the program has been suspended, pending evaluation of other Navy pump concepts. (Author)

UCRL-15153 PC **A06**/MF **A01**
Pretech, Inc., Pleasant Hill, CA.
Recompression Heater Failure: Dnamic Analysis of Rotating Train. Phase I. Final Report.
108p
Contract W-7405-ENG-48

Following the extensive malfunction and partial mechanical disintegration experienced in the Lawrence Livermore Laboratory's Recompression Heater Unit on December 8 and 12, 1978, a survey of failure data and dynamic response characteristics of the Recompression Heater Unit was requested. The subject compressor is of the dual rotor, counter rotating lobe type and is a prototype design model without previous operating history. The objectives of the first phase of the failure study were to identify the most likely failure modes and to develop a mathematical dynamic model of the subject system. This work is summarized. The results of the analytical and experimental investigation did not establish conclusive evidence of a particular failure mode as the cause of the December 12, 1978 incident. Correlation between recorded prefailure vibration history and analytical modeling does, however, show that the most probable cause is interference between lobes (insufficient dynamic clearance) caused by excitation of torsional and/or lateral critical speeds. (ERA citation 05:016289)

13H. Industrial Processes

AD-A083 089/3 PC **A16**/MF **A01**
Pratt and Whitney Aircraft Group West Palm Beach FL Government Products Div
Manufacturing Methods for Strategic Materials Reclamation.
Final rept. 15 Mar 74-31 May 79,
H. K. Gregory, and T. D. Tillman. 14 Dec 79, 364p PWA-FR-11871, AFML-TR-79-4161
Contract F33615-74-C-5019

This document details the work done on a three-phase program to establish manufacturing methods for reclamation of strategic materials. The work was divided into two categories: (1) scrap management, and (2) scrap reclamation technologies. Two material, Ti-6Al-4V and Waspaloy, were investigated for the possibility of reclamation to aerospace quality (Author)

AD-A083 214/7 Not available NTIS
Materials Research Labs Ascot Vale (Australia)
The Influence of Surface Preparation on Machining Forces and Chip Geometry.
Research note,
R. L. Woodward. 19 Jun 75, 2p
Availability: Pub. in Jnl. of Mechanical Engineering Science, v18 n3 p159-160 1976 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 456/4 PC **A02**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Large Plastic Deformation in a Deep Drawing Process.
Technical rept.,
Peter C. T. Chen. Dec 79, 9p ARLCB-TR-79036, AD-E440 059
Pub. in Proceedings of the Midwestern Mechanics Conference (16th), v10 p43-45 Dec 79.

The problem considered is the large plastic-deformation and stresses in the flange of a deep drawing process. An analytical large strain solution is obtained on the basis of a deformation theory of anisotropic plasticity. The orthotropic sheet is rigid-plastic, isotropic in its plane and hardens according to the power law. Some numerical results are presented and discussed.

BDX-613-2311 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Electromechanical Polishing of Metal Spheres.
N. E. Miller, and D. E. Engelhaupt. Dec 79, 9p
Contract EY-76-C-04-0613

Equipment has been developed to electromechanically polish metal spheres. Mechanical polishing is accomplished by the action of three cup-shaped laps which rotate against the sphere. An abrasive slurry containing an electrolyte is continuously applied to the sphere and laps. Electrochemical etching is accomplished by applying a positive potential to two of the laps and a negative potential to the third. (ERA citation 05:014007)

FE-2606-7 PC **A03**/MF **A01**
Babcock and Wilcox Co., Alliance, OH. Research and Development Div.
Development of Automated Welding Processes for Field Fabrication of Thick-Walled Pressure Vessels: Electron Beam Method. Seventh Quarterly Report, April 1-June 30, 1979.
C. M. Weber. 1979, 35p
Contract EF-77-C-01-2606

A total of 449 experimental welds have been made to date. Partial penetration welding procedures capable of producing defect-free, 4-inch deep welds have been developed in the horizontal position. The travel speed that can be acceptably used for partial penetration welding of 2 1/4 Cr-1 Mo is larger for 6-inch thick plate than for 8-inch thick plate. Although defect-free welds can be made with soft vacuum conditions, hard vacuum conditions produce the most reliable performance. A procedure for welding an 8-inch thick joint has been developed. A small test plate was welded, radiographed, and cross sectioned and found to be acceptable. A large 8-inch thick test plate was welded and found to contain porosity. Difficulties in uniformly moving this large plate appear to be responsible for the porosity encountered. A mechanical modification to the welding equipment is being made and the large plate will be welded again. 3 figures. (ERA citation 05:011068)

PATENT-4 163 516
Not available NTIS
Department of Energy, Washington, DC.

Method for Joining Metal by Solid-State Bonding.
Patent,
L. E. Burkhart, C. R. Fultz, and K. A. Maulden.
Filed 28 Dec 77, patented 7 Aug 79, 6p PAT-APPL-865 360
Supersedes PAT-APPL-865 360-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method is described for joining metal at relatively low temperatures by solid-state bonding. Planar surfaces of the metal workpieces are placed in a parallel abutting relationship with one another. A load is applied to at least one of the workpieces for forcing the workpieces together while one of the workpieces is relatively slowly oscillated in a rotary motion over a distance of about 1 exp 0 . After a preselected number of oscillations, the rotary motion is terminated and the bond between the abutting surfaces is effected. An additional load may be applied to facilitate the bond after terminating the rotary motion. 3 claims. (ERA citation 05:020866)

PB80-175904 PC **A06/MF A01**
Stanford Research Inst., Menlo Park, CA.
Exploratory Research in Advanced Automation.
Rept. no. 5, 1 May-31 Dec 75,
C. Rosen, D. Nitzan, R. Duda, G. Gleason, and J. Kremers. Jan 76, 102p NSF/RA-761851
Grant NSF-GI-38100
See also report dated Dec 73, PB-245 081.

The objective of this study is to develop a programmable, computer-controlled system of manipulators, end-effectors, and visual and force sensors that can be trained to perform material-handling, inspection, and assembly tasks with the aid of joysticks, voice control, and other natural means. Four main accomplishments are reported: (1) automatic part classification to facilitate the transfer of software for automatic training and execution of part recognition to a minicomputer; (2) programmable automation software of the PDP-11/40 minicomputer by an execution format; (3) manipulator path control to execute paths stored in memory and to interact with a moving coordinate system; and (4) system hardware of the interfaces between the PDP-11/40 minicomputer and the solid state array camera, the Stanford arm, and LSI-11 microcomputer. Appendices discuss error analysis for automatic part recognition and a training format data structure.

UCRL-52891 PC **A05/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
Thermo-Mechanical Modeling of the Gas-Tungsten-Arc (GTA) Welding Process.
D. B. Duncan. 18 Jan 80, 91p
Contract W-7405-ENG-48

A fundamental study of gas-tungsten-arc (GTA) welding was undertaken. This was initiated with a review of the GTA welding process which lead to the decision to focus experimental and analytical efforts on stationary welds on a pure material. Pure nickel was selected for the test material. Temperature, strain, and distortion measurements were made during the formation of spot welds on circular plates. Transient thermal data were obtained with thermocouples, a radiation pyrometer, and from motion pictures. Local strain was observed qualitatively from Moire interference fringe patterns. Distortion during welding was measured with displacement gages and residual distortion with a profilometer. Experimental measurements are compared with predictions of thermal and mechanical finite element codes. (ERA citation 05:013894)

13I. Machinery and Tools

AD-A083 098/4 PC **A12/MF A01**
Virginia Univ Charlottesville Dept of Mechanical and Aerospace Engineering
Proceedings of the Conference on the Stability and Dynamic Response of Rotors with Squeeze Film Bearings, 8-10 May 79.
1979, 266p ARO-16660.1-E
Contract DAAG29-79-M-0061

This document contains presentations made at the Conference on the Stability and Dynamic Response of Rotors with Squeeze Film Bearings. The conference, co-sponsored by the U.S. Army Research Office, the Applied Technology Laboratory, and the Rotor Dynamics Laboratory of the University of Virginia, Department of Mechanical and Aerospace Engineering, was held in Charlottesville, Virginia on May 8-10, 1979. The purpose of the conference was to assemble experts on squeeze film bearings to assess the current state of the art squeeze film bearing technology and to determine future research requirements. (Author)

AD-A083 449/9 PC **A02/MF A01**
Watervliet Arsenal NY
Design of Laminated Torsion Bar Springs.
Technical rept.,
Joseph A. Gentiluomo. Feb 80, 24p Rept no. WVT-PP-1

This report provides an analytical approach to the design of torsion leaf spring packs for use in cannon breech mechanisms, vehicle suspensions, etc. The design procedure presents an expeditious simple method for determining spring pack dimensions when parameters such as total required torque, spring pack angle of twist, free length of leaf spring, maximum tensile working stress, and maximum torsional working stress are known. (Author)

ESDU-80004 PC**$386.50**
Engineering Sciences Data Unit Ltd., London (England).
Fatigue Strength of Steel Coned Disc Springs.
Data item.
c1980, 16p ISBN-0-85679-282-9
Also pub. as ISSN-0141-4089.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The purpose of this report is to provide basic fatigue data on which to assess the endurance of steel coned disc springs, and, to estimate the location of failure within a stack and the point on each spring at which a fatigue crack is likely to initiate. The results of the research may be applied to springs for valves, forging dies, machine tools, pneumatic equipment, and testing apparatus. The research is limited to a series combination of identical steel coned disc springs in a wide range of geometries with cone angles of less than 15 degrees, ratio of external to internal diameter less than 5, and in which no spring is deflected through the flat position.

N80-21763/1 PC **A03/MF A01**
National Centre of Tribology, Risley (England). European Space Tribology Lab.
Case Instabilities in a 42 mm OD/20 mm Id Angular Contact Bearing.
K. T. Stevens, and M. J. Todd. May 79, 31p ESA-CR(P)-1255
Contract ESA-2584/75-MD

Spin tests were conducted on a series of angular contact, inner race separable bearings with phenolic cages using a variety of space approved lubricants. Three types of cage instability were observed in ED20 bearings and are probably typical of all such bearings; a high frequency radial vibration, an erratic axial vibration and a periodic change in cage running position from ball-riding to race-riding. The high frequency radial vibrations were observed only in outer-race-riding cages and, in cases of starved lubrication, give a significant torque increase. In cases of flooded lubrication they produce a torque decrease. The severity of the instability is increased with increasing lubricant viscosity and with increasing load. The vibrations tend to be at a single frequency which is proportional to the bearing speed. Axial instabilities are in the form of erratic and random motion and give rise to a severe torque penalty. They are always a feature of cages made with oversize ball pockets. The final form of instability gives only a small penalty in torque.

13J. Marine Engineering

AD-A083 198/2 PC **A02/MF A01**
Naval Surface Weapons Center Silver Spring MD
Analytical Models for Strategic Submarine/ASW Scenarios.
Status rept. Jan-Dec 79,
Elliot Winston. 10 Dec 79, 13p Rept no. NSWC/TR-79-475

Several game-theoretic models of SSBN/ASW scenarios are formulated and algorithms for finding solutions are presented. No discussion of numerical studies is given. (Author)

AD-A083 260/0 PC **A02/MF A01**
Naval Surface Weapons Center Silver Spring MD
A Top Level Flow Chart for Surface Ship Combat Survivability Assessment.
F. B. Fassnacht. 10 Dec 79, 20p Rept no. NSWC/TR-79-393

This report proposes a top level surface ship combat survivability assessment flow chart which is designed to (1) bound the overall problem into clearly delineated subsets, and (2) standardize measures of effectiveness and some terminology. The objective is to provide guidelines for comparing various survivability assessment models relative to each other and relative to the overall survivability problem. Major points are: (1) The overall assessment divides into three distinct phases, Cover and Deception, Weapon Destruction and Evasion, and Damage Tolerant Design/Damage Control and Repair, delineated by two unambiguous events, weapon launch and weapon impact. (2) The measures of effectiveness for each phase are all relative measures, not absolutes. (3) Specific analysis models must consider personnel as well as equipment; an unmanned ship is useless. (4) The proper MOE for Phase III is time-variation in mission readiness, not probability of kill. Using mission readiness puts emphasis on what the Fleet considers important and analysis results in terms meaningful to command levels. (5) Because of the many imponderables involved, combining the results from each phase into an overall conclusion is a human's job. No analytical model would have enough creditability to justify building it. (6) A standard set of command approved scenarios is needed which cover the full range of operations the Fleet considers meaningful in terms of combat survivability. (7) Analytical models are a useful and important engineering tool. However, they must be kept in proper perspective relative to the real world. Once a person starts taking a model literally he or she is lost.

AD-A083 261/8 PC **A06/MF A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Standardization Trials of the Stable Semisubmerged Platform, SSP KAIMALINO, with a Modified Buoyancy Configuration.
Final rept.,
Everett L. Woo, and Jerry L. Mauck. Apr 80, 121p Rept no. DTNSRDC-80/049

This report contains the results of heavy, medium, and light displacements standardization trials conducted on the Stable Semisubmerged Platform (SSP) KAIMALINO in a new buoyancy module configuration. Measurements of shaft rpm, shaft torque, ship speed, ship's heading, position of ship's control surfaces, ship's roll, ship's pitch, and relative wind velocity and direction were made throughout the speed range of 4.68 to 17.96 knots. A comparison of power characteristics of the old and the newly increased buoyancy configurations is presented. The new buoyancy scheme proved significantly superior below 13.2 knots and less desirable above that speed. Comparisons are made between the ship's automatic control system and a fixed control surfaces condition. No significant powering changes were noted. Comparisons between different nominal trim conditions were made which produced modest differences. Calm and nominally rough water trials were also compared and the effects of the sea state on powering characteristics was found to be minimal. (Author)

AD-A083 375/6 PC **A02/MF A01**
Coast Guard Washington DC
Rules and Regulations for Uninspected Vessels.
1 Apr 77, 23p Rept no. USCG-258
Supersedes report dated 1 May 1970.

This edition replaces the previous edition, dated 1 May 1970, and is a direct reprint of Parts 24-26 of

Title 46 of the Code of Federal Regulations. The CFR text of 1 October 1976, which was used for this printing, remains in effect without amendment as of this date.

AD-A083 376/4 PC **A07**/MF **A01**
Coast Guard Washington DC
Electrical Engineering Regulations.
1 Jul 77, 141p Rept no. USCG-259
Supersedes report dated 1 Jun 71.

This edition of 'Electrical Engineering Regulations' (CG-259) replaces the previous edition dated June 1, 1971, and is a direct reprint of Parts 110-113 of Title 46 of the Code of Federal Regulations. The CFR text of October 1, 1976, which was used for this printing, remains in effect without amendment as of this date. These regulations are applicable to certain merchant vessels which are subject to Title 52 of the Revised Statutes (secs, 4399-4500) and acts amendatory thereof or supplementary thereto. The specific application of these regulations is set forth in detail in Subpart 110.5. These regulations are applied only in conjunction with Subchapter D (Tank Vessels), Subchapter H (Passenger Vessels), Subchapter I (Cargo and Miscellaneous Vessles), Subchapter N (Dangerous Cargoes), Subchapter O (Certain Bulk Dangerous Cargoes), Subchapter R (Nautical Schools), Subchapter T (Small Passenger Vessels), and Subchapter U (Oceanographic Vessels), after certain factors such as the size of the vessel, the service in which the vessels is engaged, and the waters upon which the vessel is operated are considered.

AD-A083 377/2 PC **A05**/MF **A01**
Coast Guard Washington DC
Rules and Regulations for Recreation Boating.
1 Jul 77, 94p Rept no. USCG-497

This pamphlet contains builder and operator requirements for recreational boats subject to the Federal Boat Safety Act of 1971 as amended (46 U.S.C. 1451-89). The rules and regulations in this pamphlet have been reproduced from Subchapter O (Pollution) and S (Boating Safety) of Chapter 1, Title 33 (Coast Guard, Department of Transportation), of the Code of Federal Regulations which have been published in various issues of the Federal Register. These rules and regulations include amendments published in Federal Registers before 30 June 1977.

AD-A083 412/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Ocean Engineering
Absorption of Wave Energy by Elongated Bodies,
J. Nicholas Newman. May 79, 13p
Contract N00014-76-C-0365
Pub. in Applied Ocean Research v1 n4 p189-196 1979.

No abstract available.

AD-A083 425/9 PC **A03**/MF **A01**
Coast Guard Research and Development Center Groton CT
Marine Traffic Data of Lower Puget Sound.
Final rept.,
J. J. Cherny, III, R. A. Silva, M. R. Young, and N. E. Bonneau. Apr 80, 27p CGR/DC-5/79, USCG-D-28-80

Data was collected on the marine traffic at lower Puget Sound, Washington, during the period of 15-22 October 1978. The marine traffic data was recorded by means of time-lapse photography of a radar display. The daily average of marine traffic, including large, medium, and small vessels, and tugs-in-tow transiting Puget Sound between Point Pully and Tacoma Harbor is 27. (Author)

AD-A083 557/9 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Ship Performance Dept
Rudder Roll Stabilization System User's Guide.
Final rept.,
D. A. Woolaver, and G. R. Minard. Jan 80, 50p
Rept no. DTNSRDC/SPD-0930-01

Two prototype Rudder Roll Stabilization systems were built and installed on U.S. Coast Guard WHEC cutter during 1978 and 1979. This report documents the design, fabrication, and installation of these systems and provides guidance on their use and repair. Sufficient detail is provided to enable the reader to duplicate and install a similar system on a similar vessel; however, the design considerations which optimize the system for a specific vessel class and treated only briefly. A subsequent David W. Taylor Naval Ship Research and Development Center report which addresses these design considerations and provides trial documentation of the system effectiveness is currently in preparation. (Author)

AD-A083 558/7 PC **A04**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Ship Performance Dept
The Development and Evaluation of a Rudder Roll Stabilization System for the WHEC Hamilton Class.
Final rept. 1975-1980,
A. E. Baitis. Mar 80, 73p Rept no. DTNSRDC/SPD-0930-02
Contract MIPR-Z-70099-4-52249-A

A major thrust of recent research and development effort in surface ship dynamics has been in the area of ship/aircraft interfacing. This is due to the increased importance of helicopters and vertical/short takeoff and landing aircraft as the major combatant capability of nonaviation naval ships. One ongoing effort in the ship/air interface area is the joint U.S. Navy/Coast Guard Rudder Roll Stabilization Program. This program has been directed at using a ship's existing rudder(s) to control roll in a seaway. This report summarizes the steps taken to develop a rudder roll stabilization system for Coast Guard cutters of teh HAMILTON Class, including a chronology of the problem encountered and the steps taken to overcome these problems. The performance features of this system for a wide range of operating conditions are documented, and critical design features and system limitations and benefits are identified. Preliminary results from the operational evaluation of two preproduction prototype systems indicate that the system, as designed, is very effective for short duty cycle utilization, such as in typical helicopter and vertical/short takeoff and landing aircraft opeations. The system is also very effective at reducing roll over long periods of time, so as to increase habitability.

AD-A083 567/8 PC **A11**/MF **A01**
California Univ Los Angeles School of Engineering and Applied Science
A Methodology for Assessing Alternatives to Reduce Ship Collisions.
Final rept. May 78-May 79,
Ronald Rhys Morgan, and Russell R. O'Neill. May 79, 228p UCLA-ENG-7939, USCG-M-5-79
Contract DOT-CG-83886-1B
Doctoral thesis.

This research analyzes the ship collision problem in and around United States ports and develops a methodology to allow cost effective assessment of alternatives to reduce ship collisions. By analytical and statistical means, a mathematical model is developed to predict ship collisions in ports and to evaluate the parameters for Pacific Coast ports. The Collision Prediction Model is based on ship factors, port factors and exposure criteria. The model provides for including the effectiveness of various collision reduction methods through the use of multiplicative factors. Examples of benefit cost analyses are presented based on Net Present Value, forecasts of the Collision Prediction Model and the effectiveness of various collision reduction methods. Sensitivity analyses are conducted to demonstrate the ability of the proposed methods to identify critical ranges for important parameters. The methods described provide decision makers with an analytical aid for making decisions. Collision trends and priorities for alleviating the ship collision problem can be established and resources allocated appropriately. (Author)

AD-A083 568/6 PC **A17**/MF **A01**
Band Lavis and Associates Inc Severna Park MD
Background Study of Intact Stability Standards for Dynamically Supported Craft. Volume I - VI. Categorized Bibliographies.
Interim rept. Sep 78-Apr 79 on Task 1,
D. R. Lavis, E. G. U. Band, A. W. Fowler, and E. D. Hoyt. Apr 79, 396p 117-2, USCG-D-75-79
Contract DOT-CG-806510-A

A background study was performed as the first part of an examination of intact stability standards to be applied to United-States-flag, dynamically supported craft. The background study consisted of a bibliographic search, document review, preparation of separate bibliographies for four selected classes of dynamically supported craft, and an annotation and critique of the most significant documents. Few dynamic stability related accidents were found to have occurred among dynamically supported craft to date, but the few that have occured have provided supporting material for the study. Key documents were reviewed and annotated giving details of model-test programs, stability criteria, full-scale-test series, and analytical studies. It is believed that sufficient material has been found to support the next part of the study, which is to classify the craft according to their susceptibility to the development of similar stability standards. (Author)

PB80-173818 PC **A14**/MF **A01**
National Maritime Research Center-Kings Point, NY. Computer Aided Operations Research Facility.
Proceedings of Annual (3rd) CAORF Symposium on Maritime Simulation Research, Held on October 15-16, 1979.
Oct 79, 310p MA-RD-900-80014
See also Annual rept. no. 1, PB-268 821.

Contents:
CAORF and the industry;
Research into training;
Collision threat assessment;
Shiphandling in the Arctic;
Ports and piloting.

PB80-182488 PC **A07**/MF **A01**
Maritime Administration, Washington, DC.
An Assessment of the Impact of the Port and Tanker Safety Act on the U.S. Flag Tanker Fleet.
Tanker pollution abatement rept. (Final).
Mar 80, 138p MA-GEN-730-80066

The report documents a survey of the owner/operators of U.S. flag tankers to determine the impacts of the Port and Tanker Safety Act (P.L. 95-474) on their vessels. The purpose of the survey was to provide the Maritime Administration with factual information to assess: (1) the capability of U.S. shipyards to perform the necessary retrofit; (2) the availability of equipment required to be retrofitted; (3) potential scrapping and new building plans; and (4) budgetary implications related to the Maritime Administration construction differential subsidy and mortgage quarantee programs, Title V and XI, respectively. The U.S. flag tanker fleet consists of 236 vessels of 20,000 DWT and over. The impact of the Port and Tanker Safety Act on the 217 vessels surveyed can be summarized as indicated: 77 vessels - no decision; 26 vessels - owners plan to scrap prior to 1986; 10 vessels - owners plan to request dedicated trade exemption; 13 vessels - under charter to the Military Sealift Command; and 91 vessels - retrofit work has been or will be performed.

PB80-810484 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Foundations in Marine Environments. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Guy E. Habercom, Jr. May 80, 145p
Supersedes NTIS/PS-79/0551 and NTIS/PS-78/0528.

Advances in foundation engineering in marine environments are presented. Studies investigate ocean bottom properties, pile structures, soil mechanics, and seafloor response as related to foundations. (This updated bibliography contains 138 abstracts, 15 of which are new entries to the previous edition.)

PB80-810575 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cavitation: Hydrofoils. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,

Guy E. Habercom, Jr. May 80, 201p
Supersedes NTIS/PS-79/0328 and NTIS/PS-78/0259.

Studies are presented on the cavitation characteristics of various classes of hydrofoils such as fully submerged, ventilated, high speed, supercavitating, and jet flapped. Surface piercing struts are studied. Test facilities, models, and test methods are described. Discussions are made of lift, drag, oscillation, flutter, heaving, hydroelasticity, and loading. Other topics include entrainment, bubbles, unsteady forces, flow fields, sea states, cavitation noise, mathematical models, and boundary layers, along with investigations of hydrofoil craft performance. (This updated bibliography contains 194 abstracts, 9 of which are new entries to the previous edition.)

PB80-810583 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cavitation: Corrosion and Erosion. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Guy E. Habercom, Jr. May 80, 151p
Supersedes NTIS/PS-79/0329 and NTIS/PS-78/0260.

Corrosion and erosion effects of cavitation are documented. Many research areas are covered, with the exception of turbines. Studies are presented on marine propellers, pumps, dams, and spillways. Space power systems are included. The discussions refer to bubble and microbubble investigations, concepts and theories of damage, scaling laws, mathematical models, numerical analysis, and computerized simulation. Studies are given of erosion prevention, hydroabrasive wear, metal and elastomeric surface protection, and raindrop resistance. Other topics are vibration, liquid-solid interfaces, viscoelasticity, dissolved and contained gases, and flow fields, such as cryogenic, liquid metal, and multiphase. Test equipment, methods, models, and findings are described. (This updated bibliography contains 144 abstracts, 10 of which are new entries to the previous edition.)

PB80-810609 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cavitation: Propeller Cavitation. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Guy E. Habercom, Jr. May 80, 145p
Supersedes NTIS/PS-79/0331 and NTIS/PS-78/0262.

Propeller cavitation flow is covered in this bibliography. The topics include controllable pitch propellers, ship propellers of all types, supercavitation, and control systems. (This updated bibliography contains 138 abstracts, 17 of which are new entries to the previous edition.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

PATENT-4 173 327 Not available NTIS
Department of Energy, Washington, DC.
Solid Handling Valve.
Patent,
W. R. Williams. Filed 1 Jun 77, patented 6 Nov 78, 6p PAT-APPL-802 328
Supersedes PAT-APPL-802 328-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The present invention is directed to a solids handling valve for use in combination with lock hoppers utilized for conveying pulverized coal to a coal gasifier. The valve comprises a fluid-actuated flow control piston disposed within a housing and provided with a tapered primary seal having a recessed seat on the housing and a radially expandable fluid-actuated secondary seal. The valve seals are highly resistive to corrosion, erosion and abrasion by the solids, liquids, and gases associated with the gasification process so as to minimize valve failure. (ERA citation 05:019951)

13L. Safety Engineering

NUREG/CR-1327 PC **A08**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Lexington, KY. Systems Div.
Security Lighting Planning Document for Nuclear Fixed Site Facilities.
Technical rept.,
H. J. Wait, M. W. Manning, and D. R. Page. Apr 80, 175p MHSM-SD-7911

This document has been prepared as an aid in planning security lighting at nuclear fixed site facilities. While the recommendations enclosed cover the minimum requirements established in Title 10, Code of Federal Regulations (CFR), Part 73, additional suggestions are made for further enhancing a facility's security lighting and related security capabilities. Planning considerations and information are provided for lighting of the isolation zones, protected areas, portals, vital areas and material access areas. Recommendations are made relative to indoor, outdoor, fixed, portable and other unique applications of security lighting.

PB80-170038 PC **A06**/MF **A01**
Rocket Research Corp., Redmond, WA.
Use of Sodium Azide in Gas Generants for Inflatable Restraint System Inflators.
Final rept.,
Eckart W. Schmidt, and Dorothy J. Day. 22 Aug 79, 119p RRC-79-ES-105A, AOPA-1001-REV-A

The report presents a comprehensive summary of the chemistry and hazard aspects of sodium azide, a chemical anticipated to be used as a constituent in gas generants for inflatable automotive occupant restraint system inflators. Sodium azide has been safely manufactured and handled in large quantities since its discovery almost one hundred years ago. Other applications of azides include pesticides, herbicides, soil fumigants, wood preservatives, antihypertensive drugs and laboratory reagents. It is concluded that the benefit-to-risk-ratio of lives saved and injuries avoided by inflatable restraints versus accidental poisonings by gas generant chemicals is so many orders of magnitude above 1.0 that the use of toxic chemicals in inflators appears to be justified.

PB80-176084 PC **A08**/MF **A01**
National Inst. for Occupational Safety and Health, Morgantown, WV. Appalachian Lab. for Occupational Safety and Health.
A Report on the Performance of Personal Noise Dosimeters,
Ronnie L. Fortner, and Nick Blaskovich, Jr. Sep 78, 165p DHEW/PUB/NIOSH-78-186

This test report presents the results of a NIOSH evaluation of the current U.S. personal noise dosimeter market. Three units each of 9 personal noise dosimeter models were purchased. These units were subjected to acoustical, electrical, and environmental evaluations in accordance with a proposed NIOSH certification program for such devices. The test methods are described and the test results with analysis are presented.

PB80-179096 PC **A16**/MF **A01**
Westat, Inc., Rockville, MD. Research Div.
National Accident Sampling System Sample Design, Phases 2 and 3. Volume II: Exhibits.
Final rept.,
H. John Edmonds, Robert H. Hanson, David R. Morganstein, and Joseph Waksberg. Nov 79, 357p DOT-HS-805 275
Contract DOT-HS-7-01706

The report describes the Phase 2 and 3 sample design for the National Accident Sampling System (NASS). It recommends a procedure for the first-stage selection of Primary Sampling Units (PSU's) and the second-stage design for the selection of accidents for investigation. Cost models are developed to estimate the operating characteristics of the NASS. The design features extensive use of stratification and clustering. Controlled probability selection is used to insure geographic dispersion of the 75 recommended investigation sites, including the initial 10 NASS pilot sites.

PB80-182868 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Driver Performance, Passenger Safety Devices, and the Bicyclist.
Marcelline Burns, Herbert Moskowitz, R. W. Allen, J. F. O'Hanlon, and J. W. Philpot. 1979, 57p TRB/TRR-739, ISBN-0-309-02995-3
Library of Congress catalog card no. 80-16028. Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

The 9 papers in the report deal with the following areas: alcohol-impairment tests for dwi arrests; effects of roadway delineation and visibility conditions on driver steering performance; use of child-passenger safety devices in Tennessee; use of safety belts in Kentucky; automobile fuel economy and the driver; a real-world bicycle-performance measure; evaluation of the Eugene, Oregon, Greenway bicycle bridge; on-road improvements for bicyclists in Maryland; and evaluation of techniques for warning of slow-moving vehicles ahead.

13M. Structural Engineering

AD-A083 385/5 PC **A05**/MF **A01**
Baker (Michael) Jr Inc Beaver Pa
National Dam Inspection Program. Group Camp Dam. (NDI Number PA 00259, PennDER Number 4-31), Ohio River Basin, Traverse Run, Phase I Inspection Report,
John A. Dziubek. Feb 80, 89p
Contract DACW31-80-C-0025
Original contains color plates: all DTIC and NTIS reproductions will be in black and white.

Group Camp Dam is located 1.1 miles upstream from Pennsylvania Route 18 on Traverse Creek in Raccoon State Park. The dam is an earthfill embankment (with central clay core) approximately 20 feet high (maximum) and 220 feet long. The spillway, curved in plan view, is located at the left abutment of the dam and consists of a concrete paved approach, small (in height) ogee weir, and discharge chute channel. The outlet works for the dam consist of a control tower 8 feet out from shore which houses a 16 inch gate valve. The outlet conduit is a 36 inch corrigated metal pipe which is encased in 6 inches of reinforced concrete with four anti-seep collars. The dam was found to be in good overall condition at the time of inspection. Several minor items of remedial work should be performed by the owner as soon as practicable. The spillway is considered adequate.

ESDU-80003 PC**$578.50**
Engineering Sciences Data Unit Ltd., London (England).
Mean Fluid Forces and Moments on Rectangular Prisms: Surface-Mounted Structures in Turbulent Shear Flow.
Data item.
c1980, 22p ISBN-0-85679-285-3
Also pub. as ISSN-0141-4003 and ISSN-0141-397X.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The purpose of this Data Item is to provide means for estimating the mean forces and moments induced by a turbulent shear flow on surface-mounted rectangular prisms. A typical application is to a rectangular building or tower in the natural wind but the data can also be used with fluids other than air. This information is required when estimating, for example, the along-wind response of a building block to turbulence at the maximum design wind speed as detailed. In this case however, the response due to other excitation mechanisms, such as vortex shedding and galloping, should also be investigated.

N80-21765/6 PC **A18**/MF **A01**
Bristol Univ. (England). Dept. of Civil Engineering.
The Behavior of Model Ground Anchors Installed in Sand and Subjected to Pull-out and Repeated Loading.
Ph.D. Thesis.
D. V. Maddocks. Apr 78, 414p

The interaction between anchora and sand was observed directly in a plane strain model system, and the shear failure of the sand studied. A con-

tinuous record of the interaction between the sand and the model anchors was made using a stereo photogrammetric technique. The model anchors represented a plate anchor and an anchor with a rigid, short, cylindrical body with either a smooth or a rough surface. The effect of a smooth shaft surrounding the tendons of the anchors with the rough, cylindrical bodies were investigated. The results of the model tests are assessed in relation to the performance of full scale anchors.

PB80-170731 PC **A09**/MF **A01**
Polytechnic Inst. of New York, Brooklyn.
Prediction of Earthquake Resistance of Structures.
Final rept.,
Ping-Chun Wang. 20 Jan 80, 200p NSF/RA-800013
Grant NSF-PFR76-14893

The prediction of structural resistance to earthquakes provides the focus of this report. Particular attention was paid to developing an upper bound or critical ground excitation for a structure of major importance, so that a high level of confidence in the prediction of structural resistance may be achieved. The term critical excitation is defined here as the one among a class of credible excitations at a given structural design variable in question. Both linear and nonlinear structures were considered. To verify its practicality, the method was applied to several nuclear reactor structures. The results show that the method is conservative but not overly so. The responses obtained from the critical excitation are in the range of 1.1 to 2 times those produced by recorded earthquakes of the same intensity. To further enhance the practical applications, response spectra for different soil conditions were also produced.

PB80-173768 PC **A11**/MF **A01**
MBT Associates, San Francisco, CA.
Architectural Design of Building Components for Earthquakes,
Gerald M. McCue, Ann Skaff, and John W. Boyce. c1978, 234p NSF/RA-780690
Grant NSF-ATA74-23153

Review of the dynamic principles governing site and building response provides the basis for a conceptual model of building and component interaction during earthquakes. This conceptual model consists of: (1) a four-part Dynamic Model, which describes the various elements of a building, their interactive relationships during earthquakes, and the effect of their interaction on overall building response; and (2) the Dynamic Environment, which describes the nature of the seismic motions that a component will be subjected to in a particular location of a building. Any given component will have its own particular Dynamic Environment. The conceptual model is then applied to architectural design procedures. Two studies illustrate the design of building components according to the principles of the model: In a case study of an enclosure wall system, design objectives are defined, alternative design concepts studied, and the wall designed to meet the given seismic design criteria. A study of selected ceiling and partition systems defines generic ceiling systems and partitions, discusses their possible responses to input motions, identifies potentially damaging responses, and suggests means of achieving compatibility between interacting systems.

PB80-175664 PC **A07**/MF **A01**
Swedish Council for Building Research, Stockholm.
The Structural Performance of Corrugated Sheeting Due to Combined Flexural and Membrane Action,
Erik Plem. 1980, 128p D10:1980, ISBN-91-540-3209-1
Prepared by Lund Inst. of Tech. (Sweden). Dept. of Structural Mechanics and Concrete Construction.

The object of this investigation, was to find whether it was possible to utilize the trapezoidal aluminum sheeting Korragal over larger spans than at present by making due allowance for the membrane forces developed in the sheeting.

PB80-175805 PC **A07**/MF **A01**
Swedish Council for Building Research, Stockholm.
Dynamic Response of Two-Span Steel Beams Subjected to Removal of Interior Support,
Ulf Arne Girhammar. 1980, 127p D11:1980, ISBN-91-540-3211-3
Prepared by Lulea Univ. (Sweden). Div. of Structural Engineering.

A research program concerning the influence of dynamic effects in steel structures in connection with progressive collapse has been undertaken. The aim of this report is to evaluate the fundamental behavior of simple geometrical models representing the structure in the area of primary damage. The analysis is applied to steel structures. However, it should be mentioned that many of the principles and results also are applicable on concrete structures.

PB80-176936 PC **A17**/MF **A01**
Missouri Univ.-Rolla. Dept. of Civil Engineering.
Investigation of the Effect of 3-D Parametric Earthquake Motions on Stability of Elastic and Inelastic Building Systems. Report No. 1.
Structural series,
Franklin Y. Cheng, and Prasert Kitipitayangkul. Aug 79, 396p CIVIL ENGINEERING STUDY-79-10, NSF/RA-790399
Grant NSF-ENV75-18372
See also Report no. 2, PB80-176944. Errata sheet inserted.

The effect of interacting, three-dimensional ground motions on the response behavior of elastic and inelastic building systems is investigated. The building systems may have elevator cores, floor diaphragms, and shear walls of reinforced concrete as well as steel beams, columns, and bracings. The stiffness matrices are derived from the Ramberg-Osgood hysteresis model for steel and Takeda's model for concrete. The geometric matrix is formulated for the second-order effect on large deflections. The interacting forces on the yielding surfaces of the members are included. A computer program, INRESB-3D, has been comprehensively developed for achieving efficiency in both computation and data preparation. A total of 26 numerical examples have been studied for various low-rise and high-rise building systems, which show that an interacting ground motion can significantly increase internal forces, nodal displacements, ductilities, and seismic input and dissipated energy. The large ductilities and the excessive permanent deformations induced by a coupling motion exhibit severe local damage and thus diminish the serviceability of a structure.

PB80-176944 PC **A06**/MF **A01**
Missouri Univ.-Rolla. Dept. of Civil Engineering.
INRESB-3D: A Computer Program for Inelastic Analysis of Reinforced-Concrete Steel Buildings Subjected to 3-Dimensional Ground Motions. Report No. 2.
Structural series,
Franklin Y. Cheng, and Prasert Kitipitayangkul. Aug 79, 104p CIVIL ENGINEERING STUDY-79-11, NSF/RA-790400
Grant NSF-ENV75-18372
See also Report no. 1, PB80-176936.Portions of this document are not fully legible.

This report is a user's guide for the computer program, INRESB-3D, for analyzing elastic and inelastic building systems subjected to the simultaneous input of static loads and multicomponent earthquake motions, which can be applied in any direction of the structural plane. The building systems may have elevator cores, floor diaphragms, and shear walls of reinforced concrete, as well as beams, columns, and bracings. The computer program has been developed to achieve efficiency in both computation and data preparation. The output solutions include the static results of member forces and nodal displacements, as well as the dynamic results of member forces, nodal displacements, ductility factors, excursion ratios, seismic input energies, dissipated energies, and the options of plotting some of the dynamic results. The report includes the program list, a description of the program, instructions for data preparation, and a guide to modify the program's capacity.

PB80-178874 PC **A04**/MF **A01**
Lehigh Univ., Bethlehem, PA. Fritz Engineering Lab.
On Hazards of the High-Rise,
Lynn S. Beedle. Feb 79, 54p LEHIGH/FL/369-251
Grant NSF-ENV77-01578

The potential for hazards in tall buildings is presented from the standpoint of hazards due to loading, and in construction as well as those associated with potential failures in design, planning, decision-making, and concept. Sample topics of needed research, gleaned from the Monograph on Tall Buildings, are presented. Utilization of currently available information is of highest priority. Consideration of the total urban system is essential in high-rise projects of major magnitude.

PB80-183999 PC **A02**
North Carolina State Univ. at Raleigh.
Behavior of Building Systems during Hurricanes,
Jerry Machemehl. 1979, 19p UNC-SGR-152, NOAA-80032809
Grant NOAA-04-M01-16
Pub. in Proc. Int. Symp. on Behavior of Building Systems and Building Components, ASCE, Nashville, TN, p75-96 1979.

The development pressures in the coastal zone are increasing the risk to life and property. According to Suggs (1967) the average hurricane loss is 500 million dollars. Between 1925 and 1970, hurricanes caused 4911 deaths and the destruction of $7.5 billion in property damage (Brinkmann, 1975, p xi). As a result of the increased coastal development, inadequate and unenforced building codes and insufficient storm resistant structures for safe refuge, the potential for a catastrophic loss of lives and property exists and is growing. Hurricane damage to buildings in coastal hazard zones is normally attributed to wind, wave and current forces. These hurricane forces may cause severe damage to the foundation, walls or roof of a building. The behavior of building systems during a hurricane is analyzed and recommendations are made for improving building practices in coastal hazard zones.

PB80-185523 PC **A02**
North Carolina State Univ. at Raleigh. Dept. of Civil Engineering.
Model Building Code for Coastal Hazard Areas,
Jerry L. Machemehl. 1978, 10p UNC-SGR-151, NOAA-80032808
Grant NOAA-04-6-158-44054
Pub. in Proc. Coastal Zone '78 Conference, ASCE, San Francisco, CA, v13 p1453-1467 1978.

The coastal population is growing almost four times as fast as the national average. Very few coastal residents have had experience with major hurricanes. Only 22.5% of the residents in the coastal zone have experienced a major hurricane. Even though the average annual hurricane fatality figure has stabilized, there is potential for a catastrophic disaster. The most severe damage to structures in the coastal zone results from foundation failures (i.e., when the structure is torn loose from its foundation). Next in severity is roof failure caused by inadequate ties between the structure and the roof. The least severe damage but largest monetary loss involves failures in siding, broken windows, loss of porches and garages. Minimum standards for foundations, framework and roofs has been developed for the design and construction of residential and enclosed commercial structures.

PB80-810724 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cold Weather Construction. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Guy E. Habercom, Jr. May 80, 309p
Supersedes NTIS/PS-79/0573 and NTIS/PS-79/0513.

Construction methods and materials performance in cold weather and in polar environments are presented. The citations exclude permafrost construction. (This updated bibliography contains 302 abstracts, 14 of which are new entries to the previous edition.)

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A083 199/0 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
Design Construction and Evaluation of a TEM Transmission Cell for Field Probe Calibration.
Master's thesis,
Stavros Ioannis Mpoukis. Dec 79, 118p Rept no. NPS62-79-013

This paper discusses the design, construction and evaluation of a transverse electromagnetic (TEM) transmission cell for accurate generation of broadband susceptibility test fields within a shielded environment. A 0.3x0.5x1.0 m TEM cell, constructed at the Naval Postgraduate School (NPGS), was designed to operate as a 50-ohm impedance-matched system and was used for calibrating electromagnetic field probes. According to the basic design, uniform and standard TEM fields can be generated inside the cell for frequencies lower than the cutoff frequency of the device. The high frequency multimode effects can be suppressed by loading the cell with radio frequency (RF) absorbing material thus increasing the useful bandwidth. Measurements of characteristic impedance distributed along the cell, voltage standing wave ratio (VSWR) and tests of field uniformity from 1-1000 MHz were taken and described for both empty and absorber loaded cells. The method and the results of calibrating two types of probes are also discussed. (Author)

AD-A083 357/4 PC **A06**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
The Institute of Aeronautics,
Gordana Velickovic. 23 Apr 79, 119p Rept no. FTD-ID(RS)T-0396-79
Edited trans. of mono. Vazduhoplovnotehnicki Institut, Belgrade, 1971 p1-42.

No abstract available.

AD-A083 452/3 PC **A03**/MF **A01**
SRI International Menlo Park CA
Development of a Piezoelectric Shear Stress Gage for Dynamic Loading.
Final rept. Jun-Nov 78,
Y. M. Gupta, and W. J. Murri. 1 Dec 78, 49p DNA-4870F, AD-E300 742
Contract DNA001-78-C-0206

This report describes a combined analytic and experimental approach to demonstrate the feasibility of developing a piezoelectric shear stress gage sensitive only to shear loading. A simplified but general analysis of the mechanical and piezoelectric response in anisotropic crystals was carried out. Both the mechanical and piezoelectric analyses provide criteria for developing a suitable shear gage. When these criteria were applied to alpha quartz and lithium niobate (LiNbO sub 3), only the 163 degrees Y-cut LiNbO sub 3 appeared suitable for our purposes. Impact experiments, using the recently developed combined compression and shear loading facility, were conducted to verify the use of 163 degrees Y-cut LiNbO sub 3 for shear stress gages. The results of these experiments show that the gage has negligible sensitivity to compressive stresses and a very large sensitivity to shear stresses. Hence, 163 degrees Y-cut LiNbO sub 3 may be used as a stress gage sensitive only to shear loading. Further development of gages for routine use in laboratory and field measurements requires additional calibration experiments and development of proper packaging techniques for field experiments.

AD-A083 551/2 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Internal-Grating Electronographic Spectrographs for the Far Ultraviolet and X-Ray Wavelength Ranges,
George R. Carruthers. 16 Sep 71, 18p
Presented at the Symposium on Photoelectronic Image Devices (5th), London (England).

Described are concave-grating spectrographs, of the normal-incidence and grazing-incidence types, using electronographic recording with a front-surface alkali-halide photocathode on the Rowland circle. The normal-incidence version uses magnetic focusing, with unity magnification, and is useful at wavelengths above 300-400 A. The grazing-incidence version is being developed in two types; one uses magnetic focusing and near-unity magnification, and is intended for applications where high resolution is required but the available flux is relatively high; the other uses electrostatic focusing and a large demagnification ratio and is intended for applications where resolution can be sacrificed to obtain higher sensitivity for weak sources (such as celestial X-ray sources). The use of grazing incidence results in a higher quantum yield from the photocathode, as well as a higher reflectance from the grating, in the extreme ultraviolet and soft X-ray wavelength ranges. (Author)

AD-A083 553/8 PC **A04**/MF **A01**
Aeronautical Systems Div Wright-Patterson AFB OH
Aeronautical Systems Technology Needs-Test Facilities and Test Equipment.
Annual rept.,
Donald C. Kittinger. Feb 80, 56p Rept no. ASD-TR-80-5011
Supersedes Rept. no. ASD-TR-79-5039 dated Aug 79, AD-A074 886.

This report is part of a compilation of formalized Technology Needs (TN) covering Equipment Subsystems as identified by the Aeronautical Systems Division. They are based on development/operational experience, system studies and new concepts - all related to future system applications. Their presentation is to serve a threefold purpose; i.e., guidance for technology program, proven development potential, and engineering data/requirements essential for technology use in systems. The identified needs delineate progress desired in performance, control, design flexibility, safety and cost. (Author)

AD-A083 593/4 PC **A02**/MF **A01**
Harvard Univ Cambridge MA Gordon McKay Lab
The Electromagnetic Field in an EMP Simulator at a High Frequency,
Ronold W. P. King, and Dennis J. Blejer. 25 Aug 78, 9p AFOSR-TR-80-0286
Contract N00014-75-C-0648, Grant AFOSR-76-3073
Pub. in IEEE Transactions on Electromagnetic Compatibility, vEMC-21 n3 p263-269 Aug 79.

No abstract available.

AD-A083 617/1 Not available NTIS
Nondestructive Testing Information Analysis Center San Antonio TX
Proceedings of the Symposium on Nondestructive Evaluation (12th), April 24-26, 1979, San Antonio, Texas,
W. W. Bradshaw. 1979, 319p
Available from Nondestructive Testing Information Analysis Center, San Antonio, TX 78284 PC$65.00 (No copies furnished by DTIC).

The results of a four-year U.S. Air Force Logistics Command program to determine the reliability of Air Force nondestructive inspection capability are presented. The paper provides an overview of the program: objectives, scope, planning and logistics, participants, data collection, analysis, conclusions, and recommendations. Actual aircraft structural samples containing fatigue damage were transported to 21 different Air Force bases and depots, where approximately 300 Air Force technicians performed ultrasonic, eddy current, penetrant, and radiographic nondestructive inspections (NDI) on the samples. The same detailed NDI procedures were followed by all participating technicians. The individual results were recorded and accumulated in terms of 'finds', 'misses,' and 'false calls' compared with preliminary knowledge of actual flaw locations. A detailed teardown inspection of the samples at the end of the program verified and refined actual flaw tabulations. Results were computerized for data storage and retrieval and analyzed for each (NDI) method and structure sample type to provide detection probability versus flaw size (POD) curves. Other analyses provided POD curves for technician years training, experience, age, etc. The program results indicate that improvement in several specific areas is desired to meet existing requirements for critical inspection of Air Force Hardware. Several conclusions are derived concerning factors that affect Air Force inspection reliability. Recommendations for making both short-term and long-term improvements in NDI proficiency are presented. (Author)

AD-A083 619/7 Not available NTIS
Nondestructive Testing Information Analysis Center San Antonio TX
Technology Assessment of Optical Methods for Nondestructive Evaluation. Part I,
H. S. Silvus, Jr. Mar 80, 58p Rept no. NTIAC-80-2
Contract DLA900-79-C-1266
Available from Nondestructive Testing Information Analysis Center, San Antonio, TX 78284. PC$35.00 (No copies furnished by DTIC).

The objectives of the reported work were (1) to assess the status of optical techniques for nondestructive evaluation and (2) to relate available optical phenomena and methods to nondestructive inspection problems. The intended reader benefits of this technology assessment of optical methods for nondestructive evaluation are twofold. First, brief, qualitative descriptions of selected optical methods which may be useful in nondestructive evaluation applications are given to help the reader quickly understand the principles involved and to visualize typical apparatus configurations. Second, specific examples of applications of optical techniques to nondestructive evaluation problems as reported in the literature are discussed so that the reader can readily grasp the variety of nondestructive evaluation problems to which the selected optical technologies can be applied. These descriptions of specific applications are in sufficient detail that the reader can determine whether or not a particular optical method is applicable to a nondestructive evaluation problem which he faces. Additionally, descriptions of apparatus and procedures and numerical data concerning accuracies, resolutions, operating ranges, and other pertinent factors are included so that the reader can further assess applicability of a particular method to his problem and so that he can weigh possible benefits against process complexity, apparatus cost, etc. (Author)

CONF-791018-2 PC **A03**/MF **A01**
Argonne National Lab., IL.
Experimental Study of Virtual Impactors.
T. J. Yule, and C. G. Broniarck. 1979, 29p
Contract W-31-109-ENG-38
Symposium on advances in particulate sampling and measurement, Daytona Beach, FL, USA, 7 Oct 1979.

Virtual impactors are currently being used in a number of instruments to separate an aerosol into different size ranges. The virtual impactor is a variation of the standard impactor in which the impaction surface is replaced by an orifice into which particles can pass and be collected or counted. We have made an experimental study of the collection characteristics of virtual impactors. The parameters varied included: acceleration nozzle-to-collection probe distance, the ratio of the collection probe-to-acceleration nozzle diameters, and the ratio of collection probe-to-inlet flows. Measurements were also made with different collection probe geometries. It was found that it is possible to parameterize much of the data by introduction of the Stokes number and an effective minor flow collection efficiency. One disadvantage of the virtual impactor is that in the transition region particles are collected on the inside walls of the collection probe near the probe tip. The amount that is collected is a sensitive function of the probe geometry. (ERA citation 05:014120)

DP-1546 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
High-Capacity Neutron Activation Analysis Facility.
R. C. Hochel, W. W. Bowman, and C. W. Zeh.
Jan 80, 30p
Contract EY-76-C-09-0001

A high-capacity neutron activation analysis facility, the Reactor Activation Facility, was designed and built and has been in operation for about a year at one of the Savannah River Plant's production re-

actors. The facility determines uranium and about 19 other elements in hydrogeochemical samples collected in the National Uranium Resource Evaluation program, which is sponsored and funded by the United States Department of Energy, Grand Junction Office. The facility has a demonstrated average analysis rate of over 10,000 samples per month, and a peak rate of over 16,000 samples per month. Uranium is determined by cyclic activation and delayed neutron counting of the U-235 fission products; other elements are determined from gamma-ray spectra recorded in subsequent irradiation, decay, and counting steps. The method relies on the absolute activation technique and is highly automated for round-the-clock unattended operation. (ERA citation 05:013932)

EUR-5860 PC A03/MF A01
Commission of the European Communities, Luxembourg.
Analysis of Steels by X Ray Dispersion Spectrometry. Final Report.
J. Hancart. 1977, 49p
In French.
U.S. Sales Only.

During the past few years, the semiconductor detectors have been considerably improved and they are now successfully used in electron microscopy. On the other hand, the possibilities of X ray spectrometers equipped with such detectors are not yet well known. This is the reason why a research was carried out with the aim to evaluate the possible interest of such instruments for routine analysis in the steel industry and to set up appropriate analytical methods. As appears from this work, these instruments are particularly well suited for qualitative and semi-quantitative determinations. (Atomindex citation 10:422879)

EUR-6182 PC A05/MF A01
Commission of the European Communities, Brussels (Belgium).
Introduction of Neutron Metrology for Reactor Radiation Damage.
A. Alberman, J. P. Genthon, P. Mas, W. Schneider, and S. B. Wright. 1979, 80p
U.S. Sales Only.

The background of the procedures for determining irradiation parameters which are of interest in radiation damage experiments is described. The first two chapters outline the concept of damage functions and damage models. The next two chapters give information on methods to determine neutron fluences and neutron spectra. The fifth chapter gives a review of correlation data available for graphite and steels. The last chapter gives guidance how to report the relevant irradiation parameters. Attention is given to the role of the neutron spectrum in deriving values for damage fluence, energy transferred to the lattice, and number of displacements. (Atomindex citation 10:490707)

INIS-mf-4106 PC A05/MF A01
Sao Paulo Univ., Piracicaba (Brazil). Escola Superior de Agricultura Luiz de Queiroz.
Investigation on a System to Collect Water Vapor from the Air, for the Analysis of Natural Isotopic Variation.
L. L. Foloni. 1975, 84p
In Portuguese.Thesis.
U.S. Sales Only.

The development of a system to collect water vapor from air for isotopic composition analysis and its natural variation is studied. The system consists of a molecular sieve type 4A, without cooling agent and permits the choice of a sampling time varying from a few minutes to many hours through the control of the admission vapor flux. The system has been compared with other existing systems, having shown excellent performance for the collection of samples for D/H ratio analysis, with errors of the order of +- 3.0 exp 0 /oo and +- 0.6 exp 0 /oo in the delta sub(D) exp 0 /oo and delta exp 18 0 exp 0 /oo ratios, respectively. (Atomindex citation 09:364865)

JAERI-M-7497 PC A07/MF A01
Japan Atomic Energy Research Inst., Tokyo.
Radiation-Induced Emulsion Copolymerization of Tetrafluoroethylene with Propylene in Flow System, 3. Apparatus Design and Construction.
H. Watanabe, and J. Okamoto. Feb 78, 133p
In Japanese.
U.S. Sales Only.

In the final stage of study on the radiation-induced emulsion copolymerization of tetrafluoroethylene with propylene, there is engineering study seeking the optimal process and assessing copolymer production cost. For this purpose, the flow apparatus was designed and constructed according to the fundamental idea in conceptional design. In this report, design, construction and features of the apparatus are described. (Atomindex citation 09:411433)

NRCN(TN)-021 PC A04/MF A01
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Spectrochemical Laboratory - Equipment and Methods.
A. Harel, and M. Golan. Oct 78, 51p
In Hebrew.
U.S. Sales Only.

The routine methods and the equipment used by the spectrochemical laboratory of the Nuclear Research Center of the Negev (NRCN) are described. The information is presented with the view to guiding the technicians of the laboratory in their work. (Atomindex citation 10:475879)

N80-21653/4 PC A05/MF A01
Technical Univ. of Denmark, Lyngby. Inst. of Electromagnetics.
Experimental Spherical Near-Field Antenna Test Facility. Volume 1: (Summary of Work). Facility Design and Test Runs.
Final Report.
H. Bach, E. L. Christensen, J. E. Hansen, F. Jensen, and F. H. Larsen. Apr 79, 84p LD-208-V-1, ESA-CR(P)-1272-V-1
Contract ESA-3337/77-NL-AK
8.

An experimental facility for spherical near field testing of spacecraft antennas was designed and implemented in a radio anechoic chamber. Verification of the test method and the facility by measurement of an antenna near field and calculation of the associated radiation pattern was carried out.

N80-21654/2 PC A03/MF A01
Technical Univ. of Denmark, Lyngby. Inst. of Electromagnetics.
Experimental Spherical Near-Field Antenna Test Facility. Volume 2: Data Collecting and Controlling System. System Description and Software.
Final Report.
E. L. Christensen, and C. K. Hansen. May 79, 47p LD-209-V-2, ESA-CR(P)-1272-V-2
Contract ESA-3337/77-NL-AK
8.

The design and construction of the software in a data collecting and controlling system is described, for the experimental spherical near field antenna test facility developed jointly by ESTEC and Electromagnetics Institute, the Technical University of Denmark. The data collecting and controlling system is based on an Intel microcomputer system. By means of an external bus system and external logic the microcomputer may trigger and read data from the displays (phase and amplitude displays) of the receiving system. The microcomputer also controls the positioning of the antenna probe tower by connections to the antenna positioner servo system and to position displays. Included in the system is a magnetic tape transport and formatter for the purpose of data storage. The external devices are accessed by the microcomputer by memory read/write operations. The execution time of instructions comprising memory read/write to the external devices exceeds the time for internal read/write operations by only a few microseconds.

N80-21655/9 PC A08/MF A01
Technical Univ. of Denmark, Lyngby. Inst. of Electromagnetics.
Experimental Spherical Near-Field Antenna Test Facility. Volume 3: Data Collecting and Controlling System. Hardware.
Final Report.
C. K. Hansen. May 79, 166p LD-210-V-3, ESA-CR(P)-1272-V-3
Contract ESA-3337/77-NL-AK
8.

A data collection and control system (DCC) designed for the purpose of performing automatic near field measurements in closely spaced points on a spherical surface around large at antennas is described. The DCC system consists of a data bus system controlled by a microcomputer system. The microcomputer system comprises a microcomputer with the necessary software, a terminal, and a magnetic tape recorder. Features of the system described include the DCC hardware, INTEL 80/20 microprocessor system, minicomputer interface, magnetic tape recorder interface, processor interface, box interface, device interface, and programmability.

N80-21656/7 PC A05/MF A01
Technical Univ. of Denmark, Lyngby. Inst. of Electromagnetics.
Experimental Spherical Near-Field Antenna Test Facility. Volume 4: Microsys. Multiprogramming Software.
Final Report.
L. Thrane. Apr 79, 80p LD-211-V-4, ESA-CR(P)-1272-V-4
Contract ESA-3337/77-NL-AK
8.

The functions of the real time multiprogramming system MICROSYS designed for use on an INTEL 80/20 microcomputer are defined. The multiprogramming system is used for the data collection and control system of the experimental spherical near field antenna test facility. The use of the monitor routines which are used to initiate and control concurrent process execution is described. Monitor tables, process tables, the individual semaphore tables, and the queueing technique are included.

N80-21657/5 PC A08/MF A01
Technical Univ. of Denmark, Lyngby. Inst. of Electromagnetics.
Experimental Spherical Near-Field Antenna Test Facility. Volume 5: Antenna Positioner Servo System.
Final Report.
F. Hansen. Apr 79, 157p LD-212-V-5, ESA-CR(P)-1272-V-5
Contract ESA-3337/77-NL-AK
8.

The design of a programmable dual axis digital servo system for the antenna positioner of an experimental spherical near field antenna test facility is described. The main specifications of the system include. Full computer programmability of speed and acceleration, speed in the range 0.1 - 20 deg/sec (1 hour/rev - 18 sec/rev), acceleration in the range 0.01 - to 2 deg/S sq, and microstepping for precision alignment. The servo system employs dc pancake motors powered by Class AB transistor amplifiers as the driving elements and optical incremental encoders as velocity feedback elements. The servo system is designed as a velocity servo, but closing the loop through a microprocessor converts the system to a position servo employing position feedback from synchro transmitters and at a later stage from inductosyns.

N80-21658/3 PC A06/MF A01
TICRA ApS, Copenhagen (Denmark).
Experimental Spherical Near-Field Antenna Test Facility. Volume 6: Computer Simulation Studies.
Final Report.
F. Jensen. 1 Aug 79, 108p S-86-03-V-6, ESA-CR(P)-1272-V-6
Contract ESA-3337/77-NL-AK
8.

A general facility simulator for simulation of antenna measurements by the spherical near field technique is described and results of simulations are presented. It is shown that very high accuracies may be obtained by the spherical near field technique within reasonable requirements to the tolerances of the mechanical and the electrical parts of the set up. The spherical near field test facility at the Technical University of Denmark has been evaluated by simulation. The inaccuracies of the mechanical set-up are shown to cause inaccuracies on determination of the antenna directivity as

small as + or - 0.03 db at a directivity level of 45 dBi. The receiver has only been investigated for small test antennas and, typically, the receiver will cause a directivity inaccuracy of + or - 0.07 dB at a level of 21 dBi. The most important sources of inaccuracies are identified and improvements of the set-up are suggested.

N80-21659/1 PC **A03**/MF **A01**
Technical Univ. of Denmark, Lyngby. Inst. of Electromagnetics.
Experimental Spherical Near-Field Antenna Test Facility. Volume 7: Spherical Near-Field Transformation Program with Probe Correction (SNIFTC).
Final Report.
F. H. Larsen. Oct 78, 44p LD-201-V-7, ESA-CR(P)-1272-V-7
Contracts ESA-3337/77-NL-AK, DSIR-516-8158.E-451
8.

The program SNIFTC, written in FORTRAN, computes the radiated far field or radiation pattern of antennas. As input data SNIFTC uses the signal from a known field probe which scans the near field of the antenna on a spherical surface. Both the near field and the computed far field are described in spherical coordinates in points spaced equidistant in theta and phi. Correction for the aperture distribution of the probe is included. Running times of SNIFTC is of the order of nine minutes on an IBM370/165 computer for an antenna of the maximum diameter (80 lambda) which can be handled using core storage only.

N80-21660/9 PC **A04**/MF **A01**
Technical Univ. of Denmark, Lyngby. Inst. of Electromagnetics.
Experimental Spherical Near-Field Antenna Test Facility. Volume 8: Spherical Near-Field Measurements from a Compact-Range Viewpoint.
Final Report.
A. C. Ludwig, and F. H. Larsen. Apr 79, 66p LD-213-V-8, ESA-CR(P)-1272-V-8
Contract ESA-3337/77-NL-AK
8.

A procedure is described in which the local plane wave field required for measuring the far field antenna pattern is generated by an array of sources distributed over the surface of a sphere. The probe weighting factors used in spherical near field measurements, by reciprocity, may be used as excitations for a spherical array, and the results must be a plane wave field inside a central portion of the sphere. Any deviations from a perfect plane wave indicate measurement errors, on a basis independent of the antenna under test. A computer program has been written to calculate this plane wave field, and the SNIFTC program has been modified to provide the excitation factors. Several cases have been run showing that a virtually perfect plane wave field is achieved, confirming the theory and validating both programs. Phase deviations less than 0.04 deg and amplitude variations less than 0.003 dB have been found theoretically within a spherical quiet zone. Several cases have been run to evaluate the effects of truncating the array. It is shown that the size and the quality of the quiet zone is independent of the array radius for a full spherical array. For a truncated array the quiet zone becomes smaller when the array radius is decreased. Also very small arrays have been investigated and a case is treated where a 3 x 3 array at 1/3 of the Rayleigh distance produce a phase which is less than for a single element at the full Rayleigh distance.

N80-21722/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Application of Satellite Time Transfer in Autonomous Spacecraft Clocks.
A. R. Chi. Oct 79, 15p NASA-TM-80572

The conceptual design of a spacecraft clock that will provide a standard time scale for experimenters in future spacecraft., and can be sychronized to a time scale without the need for additional calibration and validation is described. The time distribution to the users is handled through onboard computers, without human intervention for extended periods. A group parallel binary code, under consideration for onboard use, is discussed. Each group in the code can easily be truncated. The autonomously operated clock not only achieves simpler procedures and shorter lead times for data processing, but also contributes to spacecraft autonomy for onboard navigation and data packetization. The clock can be used to control the sensor in a spacecraft, compare another time signal such as that from the global positioning system, and, if the cost is not a consideration, can be used on the ground in remote sites for timekeeping and control.

N80-21764/9 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
A Time-Sharing Computer Programme to Drive Up to Three Independent Fatigue Testing Machines.
W. Watt. May 79, 31p RAE-TR-79054, BR70107

A PDP-8/E computer program is described which offers a choice from seven resident software sequence generators to each of three independent hardware waveform controllers which drive electrohydraulic fatigue testing machines. The program is controlled by teletype commands and paper tape input data. Under program control, each controller may be run at a specified fixed frequency or fixed loading rate. Various analysis counts are kept which may be typed on command. One generator takes its sequence from magnetic tape and is restricted to one controller at a time.

N80-21797/9 PC **A07**/MF **A01**
Bristol Univ. (England). Dept. of Mechanical Engineering.
Defect Location in Structures by a Vibration Technique.
Ph.D. Thesis.
P. Cawley. Nov 78, 127p

A vibration technique for non-destructively assessing the integrity of structures using measurements of changes in the lower structural natural frequencies, made at a single point in the structure, in conjunction with a dynamic analysis of the system to detect, locate and quantify damage was developed. The mathematical model of the structure need not be sophisticared and one analysis is required for each type of structure to be tested. The dynamic finite element program written for the dynamic analysis work was designed and the natural frequency and pattern predictions were compared with experimental results from an aluminum plate and from carbon fibre reinforced plastic plates with a variety of ply orientations. A program was developed which provides the location of the damage site and estimation of damage severity from the results of the dynamic analysis and the changes in the structural natural frequencies. The measurement of natural frequencies from the Fourier transform of the structural response to an impulse was investigated and a method for improving the frequency resolution obtained from this type of test was developed. Results are presented from use of the technique on aluminum plate and carbon fibre reinforced plastic structures, including honeycomb panels.

PAT-APPL-6-042 462 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Nondestructive Method for Detecting Defects in Photodetector and Solar Cell Devices.
Patent Application,
Filed 25 May 79, 17p
Contract EA-77-A-01-6010
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention described herein is a method for locating semiconductor device defects and for measuring the internal resistance of such devices by making use of the intrinsic distributed resistance nature of the devices. The method provides for forward-biasing a solar cell or other device while it is scanning with an optical spot. The forward-biasing is achieved with either an illuminator light source or an external current source. (ERA citation 05:020273)

PAT-APPL-6-118 969 PC **A03**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC.
Instrument for Measuring True-RMS AC Voltage and AC Voltage Fluctuations.
Patent Application,
Jeffrey L. Silbergerg. Filed 5 Feb 80, 29p PB80-170897
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to devices for measuring fluctuations in alternating current voltage, and more particularly to instruments for measuring true-RMS line voltages, frequency and percent regulation in connection with measurements required in the testing of diagnostic X-ray equipment and similar apparatus.

PAT-APPL-6-135 038 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Pasadena Office, CA.
Method and Device for Destructive Detection of a Substance.
Patent Application,
L. C. Yang. Filed 28 Mar 80, 27p N80-21723/5, NASA-CASE-NPO-14940-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method and device for destructively detecting the presence of a substance having predetermined characteristics is disclosed. A discharge grid is provided having a sufficiently high voltage potential across its grid electrodes so that the substance having the predetermined characteristics will cause an electric spark discharge to occur between electrodes. The electric spark discharge alters the predetermined characteristics of the substance by oxidation and/or vaporization so that the substance is no longer detectable by an electric spark discharge. A means for counting the number of electric spark discharges is provided. (A count provides an indication of the concentration of the substance having the predetermined characteristics.)

PATENT-4 159 635
Not available NTIS
Department of Energy, Washington, DC.
Isokinetic Air Sampler.
Patent,
G. A. Sehmel. Filed 24 Aug 78, patented 3 Jul 79, 4p PAT-APPL-936 461
Supersedes PAT-APPL-936 461 78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An isokinetic air sampler includes a filter, a holder for the filter, an air pump for drawing air through the filter at a fixed, predetermined rate, an inlet assembly for the sampler having an inlet opening therein of a size such that isokinetic air sampling is obtained at a particular wind speed, a closure for the inlet opening and means for simultaneously opening the closure and turning on the air pump when the wind speed is such that isokinetic air sampling is obtained. A system incorporating a plurality of such samplers provided the air pumps set to draw air through the filter at the same fixed, predetermined rate and having different inlet opening sizes for use at different wind speeds is included within the ambit of the present invention as is a method of sampling air to measure airborne concentrations of particulate pollutants as a function of wind speed. (ERA citation 05:021170)

PATENT-4 162 401
Not available NTIS
Department of Energy, Washington, DC.
High-Resolution, Cryogenic, Side-Entry Type Specimen Stage.
Patent,
W. E. King, and K. L. Merkle. Filed 17 May 78, patented 24 Jul 79, 6p PAT-APPL-906 816
Supersedes PAT-APPL-906 816-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A high-resolution, cryogenic side-entry type specimen stage includes a copper block within which a

specimen can be positioned in the electron beam of an electron microscope. One end of the copper block constituting a specimen heat exchanger, means for directing a flow of helium at cryogenic temperature into the heat exchanger, and electrical leads running from the specimen to the exterior of the microscope for four point dc electrical resistivity measurements. 9 claims. (ERA citation 05:021116)

PATENT-4 170 135
Not available NTIS
Department of Energy, Washington, DC.
Coaxial Cavity for Measuring Level of Liquid in a Container.
Patent,
G. L. Booman, and F. R. Phelps. Filed 26 Sep 78, patented 9 Oct 79, 8p PAT-APPL-945 926
Supersedes PAT-APPL-945 926-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method and means for measuring the level of a liquid in a container are described. A coaxial cavity having a perforated outer conductor is partially submerged in the liquid in the container wherein the liquid enters and terminates the annular region of the coaxial cavity. The fundamental resonant frequency of the portion of the coaxial cavity which does not contain liquid is determined experimentally and is used to calculate the length of the liquid-free portion of the coaxial cavity and thereby the level of liquid in the container. 15 claims. (ERA citation 05:021105)

PATENT-4 180 775
Not available NTIS
Department of Energy, Washington, DC.
Magnetic Thin-Film Split-Domain Current Sensor-Recorder.
Patent,
E. J. Hsieh. Filed 16 Mar 77, patented 25 Dec 79, 8p PAT-APPL-778 275
Supersedes PAT-APPL-778 275-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A sensor-recorder for recording a representation of the direction and peak amplitude of a transient current. A magnetic thin film is coated on a glass substrate under the influence of a magnetic field so that the finished film is magnetically uniaxial and anisotropic. The film is split into two oppositely magnetized contiguous domains with a central boundary by subjecting adjacent portions of the film simultaneously to magnetic fields that are opposed 180 exp 0 . With the split-domain sensor-recorder placed with the film plane and domain boundary either perpendicular or parallel to the expected conductive path of a transient current, the occurrence of the transient causes switching of a portion of one domain to the direction of the other domain. The amount of the switched domain portion is indicative of the amplitude of the peak current of the transient, while the particular domain that is switched is indicative of the direction of the current. The resulting domain patterns may be read with a passive magnetic tape viewer. 12 claims. (ERA citation 05:021104)

PB80-174097 PC **A04**/MF **A01**
Houston Univ., TX. Dept. of Chemical Engineering.
Multiparameter Observations and Models of Fermentation Processes.
Final rept.,
J. E. Bailey. 1978, 74p NSF/RA-780472
Grant NSF-APR75-13538

This report concerns the development and application of flow microfluorometry techniques. The concept of flow microfluorometry observations of microbial processes is introduced in a reprint from a publication in Science, and some of the results obtained using that approach are briefly summarized. Another reprint, from the American Institute of Chemical Engineers Journal, presents an overview of the method, details on experimental methodology, the instrumentation involved, and experimental results. Extensive conventional and flow microfluorometry data on two lengthy batch fermentations are provided. Variations in extracelular enzyme activity during the batch fermentation are discussed in connection with the microbial population characteristics as revealed by flow microfluorometry experiments. Comments on this research by industrial scientists are included.

PB80-175128 PC **A14**/MF **A01**
National Bureau of Standards, Washington, DC.
Report of the National Conference on Weights and Measures (64th) Held at Portland, Oregon, on July 23-27, 1979,
Harold F. Wollin, Louis E. Babeoq, and Ann P. Heffernan. Mar 80, 316p NBS-SP-566
See also 63rd Conference dated Feb 79, PB-296 236. Library of Congress catalog card no. 26-27766.

This is a report of the proceedings (edited) of the Sixty-fourth National Conference on Weights and Measures attended by State, county, and city weights and measures officials, and representatives of the Federal Government, business, industry, and consumer organizations. Major issues discussed at this Conference included metric conversion in the United States, particularly the conversion of gasoline dispensers, problems relating to the quantity fill of packaged commodities, especially as affected by moisture loss, statistical approach to package checking, Federal grain inspection, and a legal metrology control system.

PB80-810542 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Infrared Techniques for Nondestructive Testing. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Guy E. Habercom, Jr. May 80, 124p
Supersedes NTIS/PS-79/0519 and NTIS/PS-78/0358. For the companion Published Search of the Engineering Index Data Base, see PB80-810559.

Fundamental principles of nondestructive testing and inspection, by use of infrared devices, are investigated in these Federally-funded research reports. Tire flaws, electronic circuit defects, and flaws in bonded surfaces are among the applications researched. (This updated bibliography contains 117 abstracts, 7 of which are new entries to the previous edition.)

PB80-810559 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Infrared Techniques for Nondestructive Testing. 1970-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Apr 80,
Guy E. Habercom, Jr. May 80, 145p
Supersedes NTIS/PS-79/0520 and NTIS/PS-78/0359. For the companion Published Search of the NTIS Data Base, see PB80-810542.

Fundamental principals of nondestructive testing and inspection, by use of infrared devices, are investigated in these reports gathered from a worldwide literature survey. Tire flaws, electronic circuit defects, and flaws in bonded surfaces are among the applications researched. (This updated bibliography contains 138 abstracts, 28 of which are new entries to the previous edition.)

PB80-810666 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Applications of Holography. 1975-1978 (Citations from the NTIS Data Base).
Rept. for 1975-78,
Brian Carrigan. May 80, 254p
See also 1970-1974, NTIS/PS-76/0451.

The bibliography covers studies on the applications of holography in such areas as photographing high-speed particles, nondestructive testing of material defects, strain analysis, microscopy, interferometry, vibration measurement, and medical diagnosis. Flow visualization and acoustic holography are excluded, as is basic research on holographic theory and recording techniques. (This updated bibliography contains 249 abstracts, none of which are new entries to the previous edition.)

PB80-810674 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Applications of Holography. 1979-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Apr 80,
Brian Carrigan. May 80, 65p
Supersedes NTIS/PS-79/0566 and NTIS/PS-78/0561. See also 1970-1974, NTIS/PS-76/0451 and 1975-1978, PB80-810666.

The bibliography covers studies on the applications of holography in such areas as photographing high-speed particles, nondestructive testing of material defects, strain analysis, microscopy, interferometry, vibration measurement, and medical diagnosis. Flow visualization and acoustic holography are excluded, as is basic research on holographic theory and recording techniques. (This updated bibliography contains 59 abstracts, 42 of which are new entries to the previous edition.)

SAND-79-2315C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Enhanced Method of Bubble Testing.
J. L. Hartley, and F. Garcia. 1979, 8p CONF-800311-1
Contract EY-76-C-04-0789
American Society for Non-Destructive Testing conference, Philadelphia, PA, USA, 24 Mar 1980.

Bubble leak testing consists of immersing a package in an indicator fluid in a manner to cause a pressure differential across the container wall. Leakage is then detected by bubble formation at the package opening. During bubble leak testing as required in MIL-STD-883B, the package is first evacuated for 1 hour and then immersed in fluorocarbon FC78 or FC72 detector liquid at ambient temperature and at a gauge pressure of 4 atmospheres. After 2 hours exposure to pressurized FC, a leaking package may contain either FC vapor or condensed FC liquid, or both, in addition to residual air, depending upon the leak rate and free volume of the package. Finally, to develop a pressure differential for bubble detection, the package is immersed in another liquid, FC43 heated to 125 exp 0 C in an open container. Calculations are presented indicate that gross leak testing as outlined in MIL-STD-883B can be enhanced if detector liquid FC78 or FC72 exposure is completely eliminated. Instead, the package is immersed only in FC43 indicator liquid at ambient temperature. Pressure above the liquid is reduced to 2 torr, and 60 allowed for bubble detection. Evaluation of the two leak test methods, MIL-STD-883B and Vacuum Over FC43 (VOFC) showed that the VOFC test method exhibits almost 2 orders of magnitude smaller leak detectability, and a significant reduction in testing time is obtained. Package testing time of 3 h is required by MIL-STD-883B. Testing is completed in 10 min using VOFC method. Furthermore, tests by VOFC are a direct measure of package leak rate at the desired and predictable pressure differential of 1 atm as well as the desired gas species, air. (ERA citation 05:016287)

UCID-15644-79-3 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
General Chemistry Division Quarterly Report, July-September 1979.
J. E. Harrar, and C. J. Talaber. 17 Dec 79, 60p
Contract W-7405-ENG-48

Analytical R and D for the nuclear explosives and energy programs is reported. A device was developed for simulating weak pulsed chemiluminescence. Experiments were performed to test the Smith predictor controller for enzyme-catalyzed reactions. (ERA citation 05:016237)

UCRL-15182 PC **A03**/MF **A01**
California Univ., Santa Barbara. Dept. of Electrical and Computer Engineering.
Crack Measurement System. Final Report.
G. T. Flesher, and G. Wade. 25 Sep 79, 45p
Contract W-7405-ENG-48

An electro-optical system for very high speed accurate measurement of crack motion in a specimen is described. This crack measurement system contains a light source, optical bed, electronic circuit and power supply, and is capable of measuring crack tip location 1000-times per second. The design and performance of the system are discussed. (ERA citation 05:016324)

UCRL-82976 PC A03/MF A01
California Univ., Livermore. Lawrence Livermore Lab.
Automatic Data Channel Calibration and Noise Identification.
E. E. Nesbit. 16 Oct 79, 30p CONF-791053-2
Contract W-7405-ENG-48
Shock and vibration symposium, Colorado Springs, CO, USA, 16 Oct 1979.

The Computer System Applications group at Lawrence Livermore Laboratory is developing an interactive computer-run control, calibration, and data acquisition system for its dynamic test facility. This paper briefly describes this system, derives the parameter identification equations, and discusses the design and implementation of the program to perform automatic calibration and 60, 120, and 180 Hertz noise identification on the data acquisition and control feedback channels. 5 figures, 1 table. (ERA citation 05:012889)

UCRL-83334 PC A02/MF A01
California Univ., Livermore. Lawrence Livermore Lab.
Lawrence Livermore Laboratoy Two-Stage, Light-Gas Gun.
A. C. Mitchell, and W. J. Nellis. Sep 79, 12p
CONF-7909112-1
Contract W-7405-ENG-48
30. Aeroballistic Range Association meeting, Burlington, VT, USA, 19 Sep 1979.

The Lawrence Livermore Laboratory two-stage gun was obtained from General Motors Corporation in the early 1970's. The operation and performance of the gun are described. The facility is used primarily for high pressure and high temperature material property studies and can achieve pressures about twice what can be realized with high-explosive planewave systems. (ERA citation 05:014015)

14D. Reliability

AD-A083 174/3 PC A02/MF A01
California Univ Berkeley Operations Research Center
The Observed Hazard and Multicomponent Systems.
Research rept.,
Mark Brown, and Sheldon M. Ross. Jan 80, 13p
Rept no. ORC-80-1
Contract N00014-77-C-0299, Grant AFOSR-77-3213
Prepared in cooperation with Florida State Univ., Tallahassee. Dept. of Statistics.

Let X denote the life of some system. We define the observed hazard rate at time t, call it R(t), as the instantaneous probability (density) of failure of X at time t given survival up to t and given a complete description of the system state at t. We conjecture that the total observed hazard--namely, the integral of R(t)dt from the limits of 0 to x--is an exponential random variable with mean 1 and verify this for the special case when X is the distribution of system life of an n component system having an arbitrary monotone structure function. (Author)

CEA-N-2022 PC A04/MF A01
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services d'Electronique.
New Developments About Comparison on System Structures Operating Safety.
P. Vergez. Mar 78, 68p
In French.
U.S. Sales Only.

Operating safety is considered here as the basis criterium for system structure characterization and comparison. The qualitative (logical) and the quantitative (algebraic) methods are outlined one after the other, but the link between these two techniques is also assessed. Owing to the dimensions of the scope, the survival after the first failures has been chosen as typical of the qualitative point of view, and the unsafe failure rate, as typical of the quantitative point of view. Several examples of structures are described. The author thinks that the mathematical method which is used here, and which is issued from the binary analysis, allows better working out of the problem. (Atomindex citation 10:434031)

14E. Reprography

PB80-184609 PC A04/MF A01
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Remote Sensing of Wildland Resources: A State-of-the-Art Review.
Forest Service general technical rept. (Final),
Robert C. Aldrich. Dec 79, 62p FSGTR-RM-71

A review, with literature citations, of current remote sensing technology, applications, and costs for wildland resource management, including collection, interpretation, and processing of data gathered through photographic and nonphotographic techniques for classification and mapping, interpretative information for specific applications, measurement of resource parameters, and observations and counts of occurrences.

PB80-810716 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Holographic Theory and Recording Techniques. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Brian Carrigan. May 80, 257p
Supersedes NTIS/PS-79/0601 and NTIS/PS-78/0582.

The topics cited include holographic recording techniques, theory, equipment, and materials. Among the techniques cited are color holography, x-ray holography, high speed holography, and motion picture holography. Photographic materials, films, emulsions, and equipment for recording and information storage are covered. Techniques for image motion compensation, image deblurring, wave-front reconstruction, and resolution are also cited. Other bibliographies are available in these related areas: Applications of Holography, Acoustic Holography, and Holographic Flow Visualization. (This updated bibliography contains 251 abstracts, 17 of which are new entries to the previous edition.)

15. MILITARY SCIENCES

15C. Defense

AD-A083 220/4 PC A04/MF A01
ORINCON Corp La Jolla CA
A Multi-Target Survey. Volume I.
Final rept.
Dec 79, 75p Rept no. OC-R-79-0296-1-VOL-1
Contract N00014-77-C-0296
See also Volume 2, AD-A083 221.

Contents: An Efficient Track Association Algorithm for the Multitarget Tracking Problem; and A Discussion of the Ocean Tactical Targeting Problem.

AD-A083 221/2 PC A05/MF A01
ORINCON Corp La Jolla CA
A Multi-Target Survey. Volume II.
Final rept.
Dec 79, 85p Rept no. OC-R-79-0296-1-VOL-2
Contract N00014-77-C-0296
See also Volume 1, AD-A083 220.

Contents: A Score for Correct Data Association in Multi-Target Tracking; Sound Speed Estimation as a Means of Improving Target Tracking Performance; Multiple Coherence; A Case Study in Adaptive Sound Speed Estimation; and Data Association Algorithms for Large Area Surveillance.

AD-A083 500/9 PC A03/MF A01
Honeywell Systems and Research Center Minneapolis MN
Final Report on the Optimal Placement of Military Targets in Cluttered Terrains.
Final rept. Mar 77-Jul 79,
John R. Bloomfield, Jerry Wald, and Deborah A. Smith. Jul 79, 30p Rept no. 79SRC60
Contract DAAK70-77-C-0056

This experimental program investigated the optimal placement of military targets in cluttered terrains. Three experimental areas were explored. The first area involved an embedded target search display. The discriminability of targets in this display was measured in three ways: (1) by reducing viewing time, (2) by blurring the observer's view of the display, and (3) by reducing transmissivity. A competition search situation was investigated in the second experimental area; the optical blur measure of discriminability was used. Visual search behavior was directly investigated in the third series of experiments. The findings were as follows: (1) search was slower when two areas of a given clutter density had to be searched than when a single area was searched; (2) compared to an isolated search area, the presence of an adjacent, similarly cluttered nonsearched area may result in search being slower; and (3) the presence of different clutter densities in a nonsearched area resulted in different search time distributions for search in an adjacent area. The data from these various experiments will help in characterizing the relation between a target and its detectability. Such work in perception is a necessary step toward the development of camouflage standards for the prime visual threat.

AD-A083 542/1 PC A02/MF A01
Foreign Technology Div Wright-Patterson AFB OH
Economics and Military-Technical Policy.
M. Gladkov, and B. Ivanov. 1 May 79, 18p Rept no. FTD-ID(RS)T-0552-79
Edited trans. of Kommunist Vooruzhennykh Sil (USSR) n9 p10-17 1972, by Robert D. Hill.

No abstract available.

15E. Logistics

AD-A083 081/0 PC A03/MF A01
RAND Corp Santa Monica CA
Rand DoD Survey Research Program, Fiscal Years 1978-79.
Interim rept.,
Zahava D. Doering. Dec 79, 27p Rept no. RAND/N-1165-MRAL
Contract MDA903-77-C-0108

As input into policy formulation, the Office of the Secretary of Defense (OSD) relies on data from the automated personnel files (which can be used to track accessions, promotions, attritions, etc.) and sample survey data. As part of an effort to improve the quality of the sample survey data, a Survey Research project was established at Rand. The goal of the current project is to design, develop, and institutionalize a sample survey data collection program in MRA and L as well as undertake responsibility for primary data collection efforts within the Rand Defense Manpower Studies Program. One of the project's objectives is to provide policy sensitive information about a military life cycle: enlistment decisions, career orientations, responses to policies that affect military members and their households, attrition, and decisions to leave the military. At the present time, two 'life cycle' surveys are in the data collection phase. The first, the 1978 DoD Survey of Officers and Enlisted Personnel, is a large-scale survey of the Active Force population. The second, the 1979 Survey of Personnel Entering Military Service, is designed for data collection at the point of entry into military service, i.e., after initial processing at the Armed Forces Entrance Examination Stations.

AD-A083 124/8 MF A01
Massachusetts Inst of Tech Cambridge Dept of Ocean Engineering
Operational Evaluation of Tug/Barge Systems.
Final rept. 1 Mar 78-30 Jun 79,
Jonathan D. Kaskin. Jul 79, 328p Rept no. 80-1
Contract N00014-78-C-0295
Availability: Microfiche copies only.

The purpose of this report is to identify the potential military roles of the commercial Ocean-Going Tug-Barge (OGTB) fleet and to suggest how it may be efficiently used in military operations. The overall conclusion is that the commercial fleet of OGTB's in conjunction with our nation's extensive tug and barge building facilities provides a substantial sealift capability in support of the Military Sealift Command (MSC) peacetime, contingency, and mobilization operations. In many instances it is determined that OGTB's are superior to ships in fulfilling cargo transport, Naval Fleet Auxiliary, and scientific support missions due to their ability to

separate propulsion unit (tug) from cargo/functional unit (barge). This separability allows drop-and-swap operation where specialization of function; tugs for transport and barges for storage and shoreside operations may result in mission accomplishment at less cost than if ships were used. Additionally, this flexibility of separability allows the same propulsion unit to be used in any of MCS's three mission areas as demands and priorities dictate.

AD-A083 135/4 PC **A06**/MF **A01**
Air Force Systems Command Washington DC
Quality Horizons. Volume I.
Final rept.
15 Nov 79, 105p
See also Volume 2, AD-B045 769L.

The Quality Horizons' Study was initiated by General Alton D. Slay, Commander, Air Force Systems Command, by letter dated 22 November 1978. The thrust of the study effort was to determine ways to enhance product quality in the operating environment. Study objectives were to evaluate the AFSC approach to quality assurance and identify changes with potential to: (1) improve end item quality in field use; (2) make contractors more responsible for their products; (3) make more effective use of resources; and (4) apply appropriate commercial practices.

AD-A083 249/3 PC **A05**/MF **A01**
Navy Fleet Material Support Office Mechanicsburg PA Operations Analysis Div
An Economic Retention Model for Excess Navy Material,
John F. Harding. 31 Mar 80, 83p Rept no. 139

This study evaluates alternative UICP Navy Economic Retention models. The current Navy Economic Retention Model was developed in 1965 for consumables only and was restricted in precision by computer constraints and simplifying assumptions. A replacement model is proposed that applies to RFI (Ready-for-Issue) consumable and repairable assets, as well as NRFI (Not-Ready-For-Issue) repairable assets. The proposed model represents an improved mathematical formulation that takes advantage of current ADP (Automatic Data Processing) capabilities and, thus, eliminates many simplifying assumptions of the current model. The proposed model, under current constraints, computed a lower economic retention requirement for the total of all Navy items. Holding costs were expected to decrease between $165K and $331K. However, implementation of the proposed model based solely on economic criteria would increase the economic retention quantities and increase holding costs between $47,387K and $83,451K. (Author)

AD-A083 326/9 PC **A09**/MF **A01**
Army Engineer Studies Center Washington DC
Corps Mobilization Capabilities, Requirements, and Planning.
Final rept.,
Gerard F. Greco, Daniel L. Broyles, Edward G. Rapp, James H, Tate, and William L. Mangler.
Mar 80, 163p

This monograph assesses Corps of Engineers capabilities for meeting their requirements in conventional, full, and total mobilization, and in a nuclear attack situation. The report also quantifies insofar as possible Corps requirements under these mobilization conditions, and discusses the internal actions the Corps should implement so as to meet these requirements. (Author)

AD-A083 488/7 PC **A06**/MF **A01**
Lockheed-California Co Burbank
Built-in-Test and External Tester Reliability Characteristics.
Final technical rept. May 78-Jul 79,
Donald E. Tuttle, and Richard Loveless. Mar 80, 101p LR-29052, RADC-TR-80-32
Contract F30602-78-C-0157

This report presents the results of a study of built-in-test (BIT) and external test equipment reliability impact on prime equipment design and maintenance down time. Sixty (60) units were analyzed from the S-3A, C-5A, and MK-86 weapons systems to develop BIT and external tester measurement effectiveness versus unit design characteristics. Tradeoff criteria are developed for predicting BIT and test equipment reliability during the acquisition of new systems. (Author)

PB80-173826 CP **T99**
Defense Logistics Services Center, Battle Creek, MI.
Master Cross Reference List, Part I.
Data file,
Melvin Beesley, and Trudy Sievking. Apr 80, mag tape DSA/DF-80/008
Supersedes rept. no. DSA/DF-80/005, PB80-145949.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products for price.

Part 1 of the Master Cross Reference List is a Master List of Logistics Reference Numbers cross-referenced to their applicable National Stock Number(s) in the Federal Catalog System. It contains nine basic elements of data: (1) Logistics Reference Number, assigned by the manufacturer; (2) Manufacturers Code Identifying the manufacturer; (3) Reference Number Variation Code, indicating whether the reference number is item identifying or requires additional data to correctly identify the item of supply; (4) National Stock Number/Permanent System Control Number; (5) Reference Number Category Code, that designates the relationship of a reference number to an item of supply; (6) Item Standardization Code indicates if the item is authorized or not for procurement; (7) Service Agency Designator Code, delineates the S/A that accepted a National Stock Number that was offered as a substitute for an item; (8) Description Availability, will indicate whether or not the item has a description in the DLSC Master File; and (9) Item Name, the approved name given to this item.

15F. Nuclear Warfare

AD-A083 328/5 PC **A03**/MF **A01**
BDM Corp McLean VA
DoD Theater Nuclear Forces Survivability and Security (TNFSS): Compendium of Assessments Related to TNFSSCCC Program. Volume I.
Topical rept. 27 Nov 78-31 Dec 79,
R. J. Carlin, J. G. Wilson, T. A. Julian, D. T. Poe, and W. G. Hwang. 31 Dec 79, 30p BDM-W-205-79-TR-REV-VOL-1, DNA-5040T-1, AD-E300 722
Contract DNA001-79-C-0090
See also Volume 2, AD-C021 114.

This volume describes the TNFSSCCC Compendium and indices and indicates how individual documents in the Compendium relate to specific TNFSSCCC issues.

AD-A083 335/0 PC **A11**/MF **A01**
BDM Corp McLean VA
Representative Command Post Configurations, C3 Structures, and Reference Data. Volume I.
Topical rept. Sep 77-Jul 78,
Homer E. Reynolds, and William E. Sweeney. 31 Jul 78, 227p BDM/W-78-C-0077-VOL-1, DNA-4352T-3A-VOL-1, AD-E300 733
Contract DNA001-78-C-0077

This study has been conducted as a part of DNA's Integrated Nuclear Communications Assessment (INCA) Program. It is a consolidation of information to be used as a working document for nuclear survivability analysis of eight (8) U.S. Army tactical command posts. Each command post (CP) is geographically displayed as representative of actual field deployment. The study describes each mission and deployment concept and provides representative quantities, types, and functions of personnel, equipment and communications systems based on a postulation of command, staff and communications elements which would be expected to be present at a 'snapshot' in time. The study also describes the CP interrelationships with higher, lower and adjacent units as well as the fire support requirements for Air Force and Army units. Command structures, communications structures, and technical data have been selected relative to these specific command posts and where appropriate, information was reproduced from existing publications. The results are given in the form of figures and tables and can be used in the following areas of analysis: (1) determining minimum safe offset distances between Command Posts and other potential tactical nuclear targets, (2) identifying the sensitivity of tactical unit mission effectiveness to the EMP hardness of electronic systems.

15G. Operations, Strategy, and Tactics

AD-A083 189/1 MF **A01**
General Research Corp McLean VA Operations Analysis Group
Concepts Evaluation Model (CEM) Design Specifications for: (1) Attrition and Calibration (2) Fixed Fortified Defense.
Final rept. Sep-Dec 79,
John E. Shepherd. Dec 79, 68p Rept no. GRC-1118-01-79-CR
Contract MDA903-79-C-0487
Availability: Microfiche copies only.

The Concepts Evaluation Model (CEM) is a theater combat simulation model which resolves combat at the Blue brigade and Red division level. As with all combat simulation models, input derivation for attrition and maneuver data is a major task. The basic structure of the CEM inputs include: (1) the weapon characteristics for the battle engagements; and (2) the resources available to each opposing side (Red and Blue). One of the basic ingredients in the weapon characteristics description, as used in the CEM, is the 'firepower potential'. This is a number (value) derived for each weapon type, for each engagement type, as a function of the quantity of expected rounds expended, the lethal area of a round, a correlation coefficient which equates lethal area to the probability of kill and a battle intensity factor. These firepower values are used in the CEM to compute the combat attritions and FEBA movements. This report documents a proposed attrition and calibration process intended to offset these present shortcomings. This new attrition process is centered around an algorithm developed at the US Army Concepts Analysis Agency by Dr. Alan Johnsrud. Its principal feature is its use of battle attrition, as generated by a high-resolution model, to calculate attrition for differing combat situations.

AD-A083 291/5 PC **A05**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Sensitivity Analysis of the PKHDOC Component Vulnerability Methodology.
Memorandum rept.,
G. L. Durfee, R. E. Kinsler, and W. F. Braerman.
Feb 80, 85p ARBRL-MR-02995, AD-E430 398

This study was conducted to investigate and quantify the sensitivity of PKH's (component probabilities of kill given a hit) produced by the Ballistic Research Laboratory's component vulnerability program, PKHDOC, to attack direction and to variations in several program inputs. Included in this study is a comparison of PKH's for individual faces of a component with the 'average component PKH's' produced by PKHDOC. Also analyzed are the effects on component PKH of variations in fragment shape factor, kill hole requirement, component material thickness, and component sensitive area. (Author)

AD-A083 342/6 PC **A05**/MF **A01**
Science Applications Inc McLean VA
A Mathematical Model for Assessing Target Vulnerability Research Efforts.
Final rept. 3 Apr-31 Oct 78,
G. C. Binninger. 31 Oct 78, 92p SAI-79-837-WA, DNA-4728F, AD-E300 709
Contract DNA001-78-C-0213

The methodology developed in this study is intended to provide a research engineer with a systematic approach for evaluating the merits and orientation of a target vulnerability research program. The methodology emphasizes consideration of fundamental parameters included in the weapon effects-target interaction descriptive process and the individual relative significance of these parameters in

a targeting scheme. The methodology employs a decision tree format for evaluating proposed work. The decision tree concept is used as a format for qualitative systematic review of basic experimental planning and design concepts. The components of the tree address such areas as problem definition, research objectives, physical characteristics of proposed experiments, and prior thinking as to how experimental results will be used to evaluate program objectives.

AD-A083 478/8 PC **A02/MF A01**
Foreign Technology Div Wright-Patterson AFB OH
Heroic Traditions Live and Multiply,
V. Vinogradov. 23 Aug 79, 12p Rept no. FTD-ID(RS)T-1263-79
Edited trans. of Kommunist Voorushennykh Sil (USSR) n12 p63-65 Jun 69, by Martin J. Folan.

No abstract available.

AD-A083 517/3 PC **A11/MF A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
A Method of Characterizing Air-to-Air Missile Endgame Models.
Master's thesis,
Gregory A. Keethler. Mar 80, 227p Rept no. AFIT/GST/MA/80M-2

Air-to-air missile endgame programs typically require tens of seconds of computer time to calculate a single estimate of probability of kill (P(K). Thousands of these estimates may be required in any given endgame analysis. The main objective of this research was to develop a method for characterizing an endgame model using only a fraction of the amount of data generated by such analyses. In pursuit of this objective, a second objective of actually accomplishing a characterization of an existing endgame program was established. The suggested method for characterizing air-to-air missile endgame programs is based on the semi-empirical approach and its application to SHAZAM. The method is heuristic, rather than algorithmic, due to the subjective nature of the characterization process.

AD-A083 601/5 PC **A02/MF A01**
Joint United States Military Assistance Group-Korea APO San Francisco 96302
Korean Armor Anti-Armor Analysis (Korean 4A) and a Comparison of Battle Analysis Methodologies.
Research rept.,
Bernard J. Dunn, Eun Sang Won, and Juri Toomepuu. 1979, 21p
Pub. in the Proceedings of the Pacific Conference on Operations Research, v2 p940-958 23-28 Apr 79.

No abstract available.

AD-A083 622/1 PC **A05/MF A01**
BDM Corp Monterey CA
Simple Models of Combat. Volume I. Draft for Battle Book II.
Final rept. May 78-May 79,
Terrence P. Goddard. Aug 79, 84p Rept no. BDM/M-011-79
Contract MDA903-78-C-0314, ARPA Order-3631

The work described in this report is part of a continuing effort to develop simplified, manual models of land combat that are useful to the field commander as well as the analyst. The present effort introduces range dependency, improved kill rate parameters derived from force-on-force test data, red artillery effects, and reduced visibility into the Battle Book methodology. Battle Book Calculus is a map-based dynamic combat analysis that examines minute-by-minute movement and loss exchanges for a battalion-level battle. Tactically realistic attack and defense combat activity are modeled in such a manner that all dynamic combat operations and results are lucid to the commander or analyst conducting the play. The method exploits the emerging base of data on the rates of combat processes now becoming available through force-on-force testing conducted at CDEC and other testing agencies. The method is map-oriented, and, while it could be almost totally automated, it is primarily and deliberately a manual method. By means of a minute-by-minute assessment of the unfolding battle as displayed on a map, the analyst gains an intimate understanding of the battle dynamics and interactions under study, and has the opportunity, at each minute, to exercise judgment with regard to fire distribution, withdrawal to new positions, and other tactics as would be done in the real battle by the military commander. Actions occur in realistic time sequences using the tactical doctrines and weapon systems of the opposing forces.

16. MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

AD-A083 315/2 PC **A02/MF A01**
Naval Surface Weapons Center Dahlgren VA
Rocket Motor Blast Effects and Proposed Ablative Protection for Ram Launching System EX 43. Addendum.
Final rept.,
Earl E. Biermann, and Allen B. Coates. Apr 80, 17p Rept no. NSWC/TR-80-94
Addendum to Rept. no. NSWC/TR-79-376, AD-A077 037.

The results of the flyaway and environmental tests of ablative materials described in this report show that (1) all of the materials tested are satisfactory for use in the RAM launching system and (2) Dow Corning 93-104 w/graphite is an acceptable adhesive for bonding of the recommended materials to the launcher and/or deck surface.

AD-A083 495/2 PC **A15/MF A01**
Range Commanders Council White Sands Missile Range NM Data Reduction and Computing Group
Directory of Range Data Conversion and Processing Systems.
1980, 350p Rept no. DR/CG-127-80
Supersedes Rept. no. DR/CG-127-73 dated 1973, AD-782 703.

Contents: Directory of Range Data Conversion and Processing Systems; Pre/Post Flight and Real-Time Computer Systems; Film Readers; Frequency and Wave Analysis System; Data Transmission Systems; Printers and Plotters; Range Instrumentation Computer Systems; Telemetry Front End Systems; Terminals and Graphic Displays; and Micrographics Equipment.

16B. Missile Trajectories

AD-A083 074/5 PC **A05/MF A01**
Oklahoma State Univ Stillwater Electronics Lab
Tradat Microcomputer Based Trajectory System,
R. M. Fike. 30 Nov 79, 78p SCIENTIFIC-1, AFGL-TR-80-0012
Contract F19628-78-C-0033

Tradat V is a lightweight, relatively inexpensive trajectory data system which was designed to be used with a portable autotrack antenna system. The combined Tradat V/Tracker system provides trajectory data for vehicles such as sounding rockets or balloons which are launched at remote launch sites where there are no fixed site radar sets. The tracker provides telemetry reception and the azimuth and elevation angles to the vehicle and the Tradat V system provides the following: slant range to better than + or - .05 KM RMS, using a PCM ranging system in conjunction with the vehicle telemetry system; a serial PCM trajectory data code (for tape recording) containing: (a) Time, (b) Status indicators, (c) Raw azimuth, elevation, and slant range data; and a microcomputer printout containing: (a) Time, (b) Status indicators, (c) Computed ellipsoidal Earth coordinate data (Mean sea level altitude, ground range, distance North, and distance East or mean sea level altitude, vehicle latitude, and vehicle longitude), (d) Azimuth, elevation, and slant range referenced to one of three selectable data origin sites. This report contains an electrical and physical description of the Tradat V system, set-up and operation procedures, description of an optional command through ranging system, a microcomputer software description and equation derivation section, discussion of Tradat V mission results.

16C. Missile Warheads and Fuses

AD-A083 336/8 PC **A04/MF A01**
TRW Defense and Space Systems Group Redondo Beach CA
Cost/Benefit Analysis of Reentry Vehicle Hardness Testing Using the Fast Methodology. Volume II. Methods.
Final rept. 23 Jan 78-30 Mar 79,
L. H. Donahue, and J. J. Farrell. 30 Mar 79, 64p TRW-33030-6003-RU-81-VOL-2, DNA-4949F-2, AD-E300 739
Contract DNA001-78-C-0135

The present study is an extension of previously reported Nuclear Hardness Evaluation Procedures (NHEP) efforts. In the current study, the Failure Analysis by Statistical Techniques (FAST) methodology was extended to provide new techniques for estimating the potential benefits of testing under uncertainty. A new computer code named ELF, Evaluation of Likelihood Function, was developed to provide a thorough evaluation of test results. To demonstrate the ELF code, this code was used to analyze magnetic flyer plate data on graphite resin material samples. Volume 1 of the Final Report, Applications, describes the results of the evaluations performed on the graphite resin magnetic flyer plate tests and their impact on predictions of reentry system performance. Also included in Volume 1 are the results of the analyses performed on a Lockheed Missiles and Space Company reference reentry vehicle. Volume 2 of the Final Report, Methods, describes in detail the development of the statistical and analytical techniques that were incorporated into the ELF code. Also reported in this volume is a new version of the FAST code, FAST7, Conditional Probability FAST, which shows great promise for test planning and evaluation analysis.

16D. Missiles

AD-A083 516/5 PC **A09/MF A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Toward Validation of Computer Simulation Models in Operational Test and Evaluation.
Master's thesis,
James M. Arnett. Dec 79, 178p Rept no. AFIT/GOR/SM/79D-1

Validation of complex computer simulations is considered in the context of the operational test and evaluation of the air launched cruise missile. Published literature on validation is reviewed. Validation is described as a problem-dependent process. The goal of that process is an acceptable level of confidence that the actual and simulated data agree closely enough for an inference about the simulation to be a valid inference about the actual system. The cost of accepting a given level of confidence must be balanced against the cost of obtaining a higher level. Experimental design is seen as the key to obtaining the maximum amount of information from a limited number of test runs and is discussed. The following approach to validity is suggested. Use a screening design to identify the few, most-important variables in the simulation. Use a more complete design to specify parameter/level combinations for simulated and actual data comparison. Finally, explicitly incorporate decision analysis in judging the validity of the model based on that comparison and the use that will be made of the simulation results. A fractional factorial design is used to screen out the important factors from the clutter and multipath sub-model in TAC ZINGER. (Author)

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A083 285/7 PC **A03/MF A01**
Michigan Univ Ann Arbor Dept of Chemistry
Incoherent Detection of Ultrasonic Using Thin Film Amorphous Semiconductors.
Final rept. 1 Apr 76-1 Jun 79,

A. H. Francis. Nov 79, 50p AFML-TR-79-4170
Contract F33615-76-C-5240

Thin film ultrasonic detectors have been fabricated from amorphous germanium. The detectors are insensitive to phase and function as sensitive power detectors for ultrasonic waves. Due to the mode of operation of the detectors, their usefulness is limited to the temperature range 1.5-77 degrees K. The dependence of the sensitivity of the devices upon the structural and electrical characteristics of the a-Ge material has been investigated experimentally. It was found that useful performance is obtained only when electrical conduction is by a variable range hopping mechanism. (Author)

17B. Communication

AD-A083 079/4 PC **A12**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Design and Real-Time Implementation of a Baseband LPC Coder for Speech Transmission over 9600 BPS Noisy Channels. Volume I. Description.
Final rept. Nov 78-Feb 80,
R. Viswanathan, J. Wolf, L. Cosell, K. Field, and A. Higgins. Feb 80, 255p Rept no. BBN-4327-VOL-1
Contract DCA100-79-C-0003
See also Volume 2, AD-A083 238.

This report describes the design and development of a real-time baseband LPC speech coder that transmits high-quality speech over a 9600 bps synchronous channel with bit-error rates of up to 1%. Presented are the results of our investigation of a number of aspects of the baseband LPC coder with the goal of maximizing the quality of the transmitted speech. Important among these aspects are: baseband width, baseband coding, high-frequency regeneration, and error-protection of important transmission parameters. The report also includes the system design, detailed documentation, and program listings of the MAP-300 real-time implementation of the optimized speech coder. Volume I contains the text of the report.

AD-A083 080/2 PC **A03**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Efficient Encoding and Decoding of Speech.
Quarterly progress rept. no. 1, Nov 79-Jan 80,
M. Krasner, and M. Berouti. Apr 80, 44p Rept no. BBN-4355
Contract MDA904-79-C-0411

This report discusses work on converting the output of the adaptive predictive coder into a fixed-rate bit-stream, and on improving the coded speech quality by means of various noise shaping filters. Also discussed are the computational complexity of the algorithm.

AD-A083 128/9 PC **A07**/MF **A01**
Institute for Defense Analyses Arlington VA Systems Evaluation Div
IFFN Evaluation Program. Concept Definition. Volume 2: Technical and Programmatic Aspects.
Final rept.,
Stuart H. Starr, Jessie M. Allen, John H. Daniel, Jerome E. Freedman, and E. Thomas Legere. Aug 79, 147p IDA-P-1460-VOL-2, IDA/HQ-79-21894, AD-E500 123
Contract MDA903-79-C-0018
See also Volume 1, AD-C020 642.

An evaluation program has been initiated by the U. S. Department of Defense, Test and Evaluation (DTE) to assess the ability of the current and near-term air command and control system to support the identification requirements of beyond visual range (BVR) air defense weapons. This evaluation program will consist of two phases: (1) a simulation phase, which will employ a geographically distributed testbed consisting of manned simulators and operational units driven by a central simulation facility: and (2) a field test phase, taking advantage of programmed field test exercises (FTXs) to validate the simulation phase, where possible, and enhance program credibility.

AD-A083 132/1 PC **A06**/MF **A01**
Western Union Telegraph Co Mclean VA Government Systems Div
Computer Program Development Specification Terminal Access Controller. Appendix B. Access Line Modes.
Final rept.,
6 Apr 79, 110p
Contract DCA200-C-637

This document details the link level protocols supported by the Initial Operational Capability configuration of the AUTODIN II Terminal Access Controller. It provides specific protocol rules and formats for the AUTODIN II link level Modes I, IB, IIA, and VI. (Author)

AD-A083 179/2 PC **A13**/MF **A01**
Haskins Labs Inc New Haven CT
Speech Research, A Report on the Status and Progress of Studies on the Nature of Speech, Instrumentation for Its Investigation, and Practical Applications.
Status rept. 1 Jan-31 Mar 79,
Arthur S. Abramson, Thomas Baer, Catherine Best, Guy Carden, and Robert Crowder. 31 Mar 79, 296p Rept no. SR-57(1979)
Grants PHS-HD-01994, PHS-HD-1-2420
Sponsored in part by Grants NSF-BNS76-82023, NSF-MCS76-81034, PHS-NS-13870, PHS-NS-13617 and NSF-AM-25814.

Contents: An Articulatory Synthesizer for Perceptual Research; Perception of an Oral-Nasal Continuum Generated by Articulatory Synthesis; Coarticulation and Theories of Extrinsic Timing; Orthography and the Beginning Reader; Aspiration Amplitude as a Voicing Cue for Syllable-Initial Stop Consonants Presented Monaurally and in Dichotic Competition; Stop Consonant Place Perception with Single-Format Stimuli: Evidence for the Role of the Front-Cavity Resonance; Vowel Duration Change and its Underlying Physiological Mechanisms; The Psycholinguistic Basis of Linguistic Awareness; Some Effects of Later-Occurring Information on the Perception of Stop Consonant and Semivowel; Perceptual Equivalence of Two Acoustic Cues for Stop-Consonant Manner; Syllabic Coding and Reading Ability in Word Recognition; Acoustic Cues for a Fricative-Affricate Contrast in Word-Final Position; Apprehending Spelling Patterns for Vowels; A Developmental Study; 'Perceptual Centers' in Speech Production and Perception; and Influence of Vocalic Environment on Perception of Silence in Speech.

AD-A083 195/8 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Information Processing Techniques Program. Volume I. Packet Speech Systems Technology.
Semiannual technical summary rept. 1 Apr-30 Sep 79,
Theodore Bially. 30 Sep 79, 40p ESD-TR-79-281
Contract F19628-78-C-0002, ARPA Order-2006
Supplement to Volume 2, AD-A082 726. See also AD-A066 249.

The current program has two major thrusts; i.e., the development and refinement of practical low-cost, robust, narrowband and variable-rate speech algorithms and voice terminal structures, and the establishment of an experimental wideband satellite network to serve as a unique facility for the realistic investigation of voice/data networking strategies. This report covers work in the following areas: development of a custom-LSI-based narrowband channel vocoder; studies and real-time implementation of improved vocoder structures and algorithms; evaluation of speech processing capability of CCD-based spectrum analysis hardware; preparation of hardware and firmware for an upcoming speech algorithm test and evaluation program; design and implementation of packet voice terminals and local area access facilities; progress in satellite network and internetted packet voice conferencing and in the development of new packet voice network protocols; and design of a traffic emulation module for the wideband experimental network.

AD-A083 204/8 PC **A04**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Pluribus TIP User's Guide.
N. W. Mimno, and E. Wm. Hiscox. Jun 79, 61p Rept no. BBN-4135
Contract DCA200-C-616

The Terminal Interface Message Processor, or TIP, provides the necessary hardware and software to allow a user at a terminal access to Hosts on the ARPANET. The Pluribus TIP Users' Guide provides scenarios for using the TIP, describes available commands and features, and discusses some general issues and background. The Guide may be read through or simply used as a reference. Users familiar with the 316 TIP may wish to take note of the section 'Differences Between the 316 and Pluribus TIPs.'

AD-A083 238/6 PC **A10**/MF **A01**
Bolt Beranek and Newman Inc Cambridge MA
Design and Real-Time Implementation of a Baseband LPC Coder for Speech Transmission over 9600 BPS Noisy Channels. Volume II. Programming Listings.
Final rept. Nov 78-Feb 80,
R. Viswanathan, J. Wolf, L. Cosell, K. Field, and A. Higgins. Feb 80, 206p Rept no. BBN-4327-VOL-2
Contract DCA100-79-C-0003
See also Volume 1, AD-A083 079.

This report describes the design and development of a real-time baseband LPC speech coder that transmits high-quality speech over a 9600 bps synchronous channel with bit-error rates of up to 1%. Presented are the results of our investigation of a number of aspects of the baseband LPC coder with the goal of maximizing the quality of the transmitted speech. Important among these aspects are: baseband width, baseband coding, high-frequency regeneration, and error-protection of important transmission parameters. The report also includes the system design, detailed documentation, and program listings of the MAP-300 real-time implementation of the optimized speech coder. This report is bound in two volumes. Volume I contains the text of the report, and Volume II contains the program listings of the MAP-300 speech coder implementation. (Author)

AD-A083 262/6 PC **A05**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
A High Performance UHF Satellite Transmitter.
Technical note,
Mark L. Stevens. 28 Nov 79, 86p TN-1979-68, ESD-TR-79-273
Contract F19628-80-C-0002

This note describes the design, construction, and performance of a 50 W UHF satellite transmitter which was built to demonstrate design and construction techniques that lead to easy replication of circuits in a manufacturing environment, without sacrifice in performance. High-efficiency performance is demonstrated over a 20 MHz band, centered at 260 MHz, with a fixed-tuned, single-ended design. (Author)

AD-A083 366/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Measurement Automatization of PCM 30/32 Teletransmission Systems Signalling Unit.
Marian Zientalski. 29 Jun 79, 13p Rept no. FTD-ID(RS)T-0851-79
Edited trans. of Przeglad Telekomunikacyjny (Poland) v51 n2 p36-38 1978, by F. Zaleski.

No abstract available.

AD-A083 445/7 PC **A22**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Remote Tropospheric Radio Communication.
I. A. Gusyatinskiy, A. S. Nemirovskiy, A. V. Sokolov, and V. N. Troitskiy. 19 Mar 80, 525p Rept no. FTD-ID(RS)T-0251-80
Unedited machine trans. of Dal'nayaya Troposfernaya Radiosvyaz', Moscow, 1968 p1-247.

No abstract available.

AD-A083 544/7 PC **A05**/MF **A01**
Institute for Defense Analyses Arlington VA Program Analysis Div
Pricing and Cost Allocation for AUTOVON.
Final rept.,
William F. Beazer. Mar 79, 94p IDA-S-506, IDA/HQ-78-20709, AD-E500 128
Contract DAHC15-73-C-0200

The study analyzes the current rate structure of AUTOVON and the way in which costs are allocated among users as defined in broad categories.

It makes recommendations about ways in which cost allocation might be improved, examines the problem of congestion under the current rate structure, and the effects on cost allocation and subscriber behavior of adopting a price scheme based on usage. A methodology is developed for calculating appropriate usage charges relative to distance and holding time.

AD-A083 577/7 PC **A03**/MF **A01**
Boston Univ MA Coll of Engineering
A Quantitative Approach to Aggregation in the Modeling of Tactical Command, Control, and Communication Systems.
Rept. no. 1 (Final),
Henry D'Angelo. 8 Mar 80, 48p AFOSR-TR-80-0258
Grant AFOSR-79-0101

This research effort is directed at determining the feasibility of using structural-sensitivity measures as the basis for simplifying large mathematical models of dynamic systems (e.g., models of tactical command, control, and communication systems). Toward this end, a FORTRAN program was written which can be used to simplify models characterized by sets of linear differential equations. Specifically, the program determines the optimal simplified model (i.e., the set of coefficients characterizing the set of linear differential equations) of specified dimension corresponding to the original linear model of higher dimension. The algorithm, on which the FORTRAN program is based, minimizes an objective function which is defined in terms of the structural sensitivities of the state variables to be preserved in the simplified model. The program inputs are the set of coefficients which define the linear differential equations representing the original model, the dimension of the simplified model to be determined, and the set of parameters defining the objective function to be minimized. The program outputs are the set of coefficients which define the optimal simplified model and the value of the objective function corresponding to the optimal simplified model. (Author)

N80-21412/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
A Digitally Implemented Communications Experiment Utilizing the Communications Technology Satellite, Hermes.
H. D. Jackson, and J. Fiala. Mar 80, 19p NASA-TM-81452, E-379

Developments which will reduce the costs associated with the distribution of satellite services are considered with emphasis on digital communication link implementation. A digitally implemented communications experiment (DICE) which demonstrates the flexibility and efficiency of digital transmission of television video and audio, telephone voice, and high-bit-rate data is described. The utilization of the DICE system in a full duplex teleconferencing mode is addressed. Demonstration teleconferencing results obtained during the conduct of two sessions of the 7th AIAA Communication Satellite Systems Conference are discussed. Finally, the results of link characterization tests conducted to determine (1) relationships between the Hermes channel 1 EIRP and DICE model performance and (2) channel spacing criteria for acceptable multichannel operation, are presented.

N80-21623/7 PC **A13**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Future Large Broadband Switched Satellite Communications Networks.
Final Report.
D. H. Staelin, and R. R. Harvey. Dec 79, 281p NASA-CR-159961
Contract NAS5-25091

Critical technical, market, and policy issues relevant to future large broadband switched satellite networks are summarized. Our market projections for the period 1980 to 2000 are compared. Clusters of switched satellites, in lieu of large platforms, etc., are shown to have significant advantages. Analysis of an optimum terrestrial network architecture suggests the proper densities of ground stations and that link reliabilities 99.99% may entail less than a 10% cost premium for diversity protection at 20/30 GHz. These analyses suggest that system costs increase as the 0.6 power of traffic. Cost estimates for nominal 20/30 GHz satellite and ground facilities suggest optimum system configurations might employ satellites with 285 beams, multiple TDMA bands each carrying 256 Mbps, and 16 ft ground station antennas. A nominal development program is outlined.

N80-21652/6 PC **A11**/MF **A01**
Electrical Research Association, Leatherhead (England).
Study of an Antenna System for an Experimental TV Satellite.
Final Report.
N. Adatia, K. Keen, B. K. Watson, G. Crone, and N. Dang. Mar 79, 234p RFTC-420877, ESA-CR(P)-1245
Contract ESA-3285/77-NL-AK(SC)

The results of an investigation carried out to establish the feasibility of an antenna system for an experimental TV broadcast satellite application are described. The antenna is intended to generate a circularly polarized beam of elliptical cross section and high degree of polarization purity. The research described is concerned with the feasibility of realizing such a performance employing an elliptically contoured offset Cassegrain reflector system in conjunction with a circularly polarized corrugated rectangular horn feed. Experimental and theoretical results are presented for the radiation pattern characteristics of an elliptically contoured reflector system used in conjunction with linearly polarized and circularly polarized primary feed elements. Attention is then given to the performance and the limitations of the corrugated rectangular horn operated in circular polarization.

N80-22078/3 PC **A13**/MF **A01**
Battelle Inst., Frankfurt am Main (Germany, F.R.).
Study on Intersatellite Laser Communication Links.
Final Report.
W. English. Jul 79, 292p BF-R-63.749-5, ESA-CR(P)-1259
Contract ESTEC-3555/78-NL-PP(SC)

A laser communication system was investigated which will be capable of establishing a two way 1 gigabit per second data link between two geostationary satellites with a bit error rate greater than or equal to 0.00001. By a critical evaluation of possible laser types the SHG0Nd:YAG laser and the CO2 laser were recognised as the most promising candidates to meet the fundamental system performance requirements. From a preliminary design of both systems and a comparative analysis at subsystem level, it is concluded that the CO2 laser system is more suited to meet the technical objectives and involves fewer development risks. For this preferred system, a design concept is outlined and detailed component performance requirements and operational characteristics are defined. A prominent design feature is the use of an external light pipe modulator in combination with appropriately selected laser lines (for signal transmitter and local oscillator) which provide a growth potential in bandwidth of up to 5 GHz.

PB80-174436 PC **A08**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Simulation Modeling of Emergency Medical Services (EMS) Telecommunication Systems,
H. David Hunt. Jan 80, 162p NTIA/SP-80-5

This study explores the application of fundamental computer simulation techniques to the planning and evaluation of an emergency medical services (EMS) system. The study is designed to assist local communication managers and planners in designing, modifying and evaluating their EMS telecommunication system to support the goals and objectives of their emergency medical services (EMS) system. This study assumes time to be a critical EMS system variable. The time variable is examined by dividing the EMS system functions into nine major processes. Using flow charts these nine processes are then factored into subprocesses for further analysis. The computer simulation language employed in this model is the General Purpose Simulation System (GPSS). The GPSS is a block-diagram language designed to accommodate the discrete nature of the EMS subprocesses. A minimum of user experience is required to understand and program the model using GPSS. Document includes a significant bibliography.

17D. Electromagnetic and Acoustic Countermeasures

AD-A083 358/2 PC **A17**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Electronic Countermeasures,
A. Razingar. 30 Aug 79, 391p Rept no. FTD-ID(RS)T-0498-79
Edited trans. of mono. Elektronska Protivdejstva, Vojnoizdavacki Zavod, Beograd, 1971 p5-347.

No abstract available.

17E. Infrared and Ultraviolet Detection

AD-A083 539/7 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Glass and Metal Cryostat for Cooled Infrared Radiation Detectors,
Tadeusz Piotrowski. 9 May 79, 8p Rept no. FTD-ID(RS)T-0476-79
Edited trans. of Pomiary, Automatyka, Kontrola, (Poland) v24 n1 p83 1978, by F. Zaleski.

No abstract available.

17G. Navigation and Guidance

AD-A083 314/5 PC **A04**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-Sur-Seine (France)
The Impact of Global Positioning System on Guidance and Controls Systems Design of Military Aircraft. Volume IIA. Specific Application Study No. 1. Application of the NAVSTAR/Global Positioning System to the Close Air Support Mission-A Case Study.
Advisory rept.,
L. J. Urban. Feb 80, 68p Rept no. AGARD-AR-147-VOL-2A
Appendix IIA to report dated Sep 79, AD-A083 314. See also Appendix IID, AD-A082 957.

The objectives of the Guidance and Control Panel Working Group 04 were to consider the integration of GPS in aircraft systems and make recommendations for implementation. In Volume II are presented the results of four specific studies of the application of NAVSTAR to Close Air Support, Sea Patrol, Interdiction Strike and Strike RPV. Volume IIA addresses the first of those specific studies. A currently available models was selected, namely the F.4E aircraft equipped with the ARN-101 weapon delivery system. This was selected since it represents the current state-of-the-art for externally aided (LORAN) digital avionics system integrated into a reasonably modern fighter aircraft which is currently in the operational inventory of several NATO countries.

AD-A083 325/1 PC **A06**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. Communications Initial Evaluation Report. George AFB, California 10-17 December 1979.
Final rept.,
Paul F. Finks, Jr. 15 Feb 80, 108p Rept no. 79/66C-196

A Communications Initial Evaluation was performed at George AFB, California from 10-17 December 1979. The purpose of the evaluation was to define the capabilities and limitations of the ATC communications system. Included in this report are the results and analysis of ground equipment and system measurements, and correlation of predicted and measured receive signal levels as they affect horizontal and vertical coverage. This report can be used as a guide for anticipated performance of the ATC communications system until there is a deletion, addition, relocation of equipment, or a change in the horizon profile. (Author)

AD-A083 598/3 PC **A05**/MF **A01**
MITRE Corp McLean VA METREK Div

Project Plan: Operational Evaluation of Terminal ATC with DABS.
Technical rept.,
H. S. Gabrieli. Mar 80, 86p MTR-80N00003, FAA-NA-80-168
Contract DOT-FA80WA-4370

This report describes a two-phase effort intended to complement the on-going DABS technical tests by assessing the operational implications and man-machine interactions when DABS is integrated with the ARTS III system. The effort includes simulated and live runs with the participation of ATC controllers, and an analytical evaluation of the effect of DABS on aircraft separation requirements, ATC procedures, and controller workload. (Author)

N80-21299/6 PC **A11**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Global Positioning System for General Aviation: Joint FAA-NASA Seminar.
Summary Report.
1978, 236p NASA-TM-81017
Prepared in Cooperation with FAA, Washington, D. C. Seminar Held at Washington, D. C., 16-17 Oct. 1978.

No abstract available.

17H. Optical Detection

AD-A083 620/5 PC **A04**/MF **A01**
Northrop Research and Technology Center Palos Verdes Peninsula CA
Passive Determination of Range and Depth from Motion Stereo Analysis.
Final technical rept. Jan 78-Sep 79,
William B. Lacina, and William Q. Nicholson. Dec 79, 56p Rept no. NRTC-79-41R
Contract DAAK40-78-C-0047, ARPA Order-3501

This report describes results of passive depth and range determination from processing multiframe imagery obtained with a moving sensor platform, by exploitation of motion stereo analysis. Results obtained from synthetic and real imagery are presented. Application of the present technique to autonomous target acquisition is discussed. (Author)

N80-21720/1 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
A High Speed Spectral Radiometer with Full Electronic Control.
H. Albrecht, and H. W. Spaude. Nov 79, 18p
RAE-LIB-TRANS-2035, BR73046
Transl. Into English from Optik (Germany, F.R.), V. 53, No. 2, 1979 p 89-103.

A measurement setup which allows almost complete automatic spectral radiation measurement is described. The useful spectral range is from 0.25 to 2.5 micrometers and is scanned with a maximum speed of 0.5 micrometers/s, wavelength accuracy being 0.001 nm. The device has an electronic control and correcting system which evaluates the measurement signal in accordance with the complete spectral sensitivity function of the device. The control and correcting system is described. The device is discussed in connection with solar radiation measurements and their use.

17I. Radar Detection

AD-A083 247/7 PC **A03**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Radar Propagation Errors in the Arctic Ionosphere,
J. Buchau, G. J. Gassmann, C. P. Pike, and R. A. Wagner. 11 Apr 80, 39p Rept no. AFGL-TR-80-0119
Pub. in Air Force Surveys in Geophysics, n231, Rept. no. AFCRL-71-0169, p43-79 1971.

No abstract available.

AD-A083 264/2 PC **A07**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Pattern Degradation of Space Fed Phased Arrays.
Project rept.,
John Ruze. 5 Dec 79, 144p SBR-1, ESD-TR-79-278
Contract F19628-80-C-0002, ARPA Order-3724

The far field pattern degradation of space fed phased arrays suitable for a space based radar is examined. The effects considered are: Structural; (1) Axial lens surface distortions, (2) Uniform radial thermal expansion, and (3) Axial and lateral feed displacements; Electrical; (1) Element phase and amplitude excitation errors, and (2) Failed elements. An introductory section discusses the size, cost, and weight penalties of low sidelobe designs. The final section presents a method of phase compensation or coherence of large axial lens distortions. (Author)

AD-A083 371/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
The Problem of Aperture Synthesis of Antennas Which Are Mounted on Moving Objects,
S. G. Rudneva. 12 Jul 79, 22p Rept no. FTD-ID(RS)T-1036-79
Edited trans. of mono. Sovremmennyye Problemy Antenno-Volnovodnoy Tekhniki, 1967 p176-188, by Charles T. Ostertag, Jr.

No abstract available.

AD-A083 493/7 PC **A06**/MF **A01**
Georgia Inst of Tech Atlanta Engineering Experiment Station
Near Millimeter Wave Radar Technology.
Interim technical rept. on Phase 1,
R. W. McMillan, R. E. Forsythe, R. A. Bohlander, R. G. Shackelford, and R. N. Trebits. 11 Jan 80, 106p
Contract DAAK70-79-C-0108

The proposed system consists of a transmitter, receiver, antenna duplexer, and antenna subsystem. An attempt will be made to phase lock the Varian VKY-2429R EIO transmitter to the receiver local oscillator to give a quasi-coherent system. Quasi-coherent means that the transmitted pulse is coherent near its center and incoherent during rise and fall times. The receiver will be of all solid state design, using an f/4 subharmonic mixer developed at Georgia Tech together with a Hughes 55 GHz phase locked Gunn local oscillator. The antenna duplexer will be an optical subsystem, depending partially for its operation on the change in sense of circular polarization when reflected from a single-bounce target, and partially on the operation of an interfereometric switch used for receiver isolation. The antenna will be a 15 cm (6 inch) lens machined from a piece of TPX plastic, and the beam will be steered by a 2-axis gimbal system. Although there will be no signal processing hardware included in the proposed system, the antenna will have both a raster scan mode for search and a conical scan mode for track. The entire system will be designed to be amendable to the addition of radar signal processing at a later time.

N80-21650/0 PC **A10**/MF **A01**
Selenia S.p.A., Rome (Italy).
Synthetic Aperture Radar Study, Volume 1.
Final Report.
G. Meneghini, P. Porzio, J. Collomb, and P. Palluel. Apr 79, 216p ESA-CR(P)-1242-V-1
Contract ESA-3696/78-NL-AK
2.

A feasibility study for a high power amplifier used in pulsed mode in the average power range of 300 and 1000 watt and pulsed power 5000 watt and 20,000 watt is presented. After a detailed technical discussion and study of the tradeoffs for the transmitter parts (EPC, modulator, crow-bar and tube) and the relevant technology to be used, a solution for the synthetic aperture radar (SAR.) transmitter is proposed and illustrated in detail. An analysis of the time schedule and costs for the development and production of the proposed transmitter is given.

N80-21651/8 PC **A12**/MF **A01**
Selenia S.p.A., Rome (Italy).
Synthetic Aperture Radar Study, Volume 2.
Final Report.
G. Meneghini, P. Porzio, J. Collomb, and P. Palluel. Apr 79, 272p ESA-CR(P)-1242-V-2
Contract ESA-3696/78-NL-AK
2.

Results of a feasibility study for high power amplifiers used in pulsed mode in the average power range of 300 and 1000 E watt and pulsed power 5000 watt and 20,000 watt and applicable to the synthetic aperture radar transmitter are provided. Tables and figures generated during the study are presented.

N80-21696/3 PC **A11**/MF **A01**
EMI Electronics Ltd., Hayes (England).
Study of Local Oscillator Stability Specifications for Synthetic Aperture Radar.
J. Thraves, M. Kostka, S. Blake, and P. Morley. Jul 79, 244p ESA-CR(P)-1273
Contract ESTEC-3818/78-NL-AK(SC)

The theory of local oscillator noise performance was surveyed and the consequent degradation of a synthetic aperture radar (SAR) image derived. Local oscillator performance specifications including necessary amplifiers and multipliers (e.g., short term stability, a.m. spectral noise power density, f.m. spectral noise power density, r.m.s. phase error, spurious and harmonic generation, etc.) the consequent image degradation. The worst sources of degradation were identified and the possibility of improving the overall performance by modifying the overall degradation budget was analyzed. A completely justified specification to be used as a target for hardware is detailed.

17J. Seismic Detection

AWRE-O-38/78 PC **A04**/MF **A01**
Ministry of Defence, Aldermaston (England). Atomic Weapons Research Establishment.
Experimental Operation of a Seismological Data Centre at Blacknest.
F. H. Grover. Oct 78, 56p
U.S. Sales Only.

A short account is given of the development and operation of a unit within Blacknest which acts as a centre for handling data received from overseas seismological array stations and stations in the British Isles and also exchanges data with other centres. The work has been carried out as a long-term experiment to assess the capability of small networks of existing research and development stations to participate in the monitoring of a possible future Comprehensive Test Ban treaty (CTB) and to gain experience of the operational requirements for Data Centres. A preliminary assessment of a UK National Technical Means (NTM) for verifying a CTB is obtained inter alia. (Atomindex citation 10:426748)

18. NUCLEAR SCIENCES AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

ANL/FPP/TM-125 PC **A09**/MF **A01**
Argonne National Lab., IL.
STARFIRE: A Commercial Tokamak Reactor.
Dec 79, 193p
Contract W-31-109-ENG-38

The purpose of this document is to provide an interim status report on the STARFIRE project for the period of May to September 1979. The basic objective of the STARFIRE project is to develop a design concept for a commercial tokamak fusion electric power plant based on the deuterium/tritium/lithium fuel cycle. The key technical objective is to develop the best embodiment of the tokamak as a power reactor consistent with credible engineering solutions to design problems. Another key goal of the project is to give careful attention to the safety and environmental features of a commercial fusion reactor. (ERA citation 05:017208)

ANL/FPP-79-2 PC **A05**/MF **A01**
Argonne National Lab., IL.
Fusion Power Program. Quarterly Progress Report, January-March 1979.
Aug 79, 94p
Contract W-31-109-ENG-38

This quarterly report summarizes the Argonne National Laboratory work performed for the Office of Fusion Energy during the January-March 1979 quarter in the following research and development areas: materials; energy storage and transfer; tritium containment, recovery and control; advanced reactor design; atomic data; reactor safety; fusion-fission hybrid systems; alternate applications of fusion energy; and other work related to fusion power. (ERA citation 05:017264)

CONF-791057-3 PC **A02/MF A01**
Sandia Labs., Albuquerque, NM.
Hydrogen Recycling: Fundamental Processes.
S. T. Picraux. 1979, 5p
Contract EY-76-C-04-0789
Workshop on hydrogen recycling, Livermore, CA, USA, 17 Oct 1979.

The recycling of hydrogen at the interior surfaces of plasma devices is an important and largely uncontrolled process at present. There remain important questions concerning the fundamental processes involved in recycling phenomena and the material dependence of these pocesses. A primary aim of the fundamental studies should be to develop sufficient understanding of the influence of materials properties on hydrogen recycling so that the materials and machine operating conditions can be selected to give maximum control of hydrogen recycling. In addition, realistic models of the wall behavior under recycling conditions need to be developed. Such modeling goes hand-in-hand with both fundamental process studies and in situ measurements, and may provide sufficient overall understanding of the influence of recycling on machine operation to impact design decisions effecting such important processes as impurity control, plasma, fueling, and pulse length. (ERA citation 05:017176)

CONF-791102-104 PC **A02/MF A01**
Argonne National Lab., IL.
Development of a 50 KA Cryostable AC Superconducting Cable.
S. H. Kim, and S. T. Wang. Nov 79, 3p
Contract W-31-109-ENG-38
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

A design of a 50 kA cable at 8 T for superconducting ohmic heating coils is presented. The cable, which will be cryostable with relatively low ac losses, is composed of 24 basic cables and stainless steel backbone. A non-metallic cryostat for the test of pancake coils of the cable is developed. (ERA citation 05:017217)

CONF-791102-105 PC **A02/MF A01**
Argonne National Lab., IL.
Safety of Superconducting Fusion Magnets: Twelve Problem Areas.
L. R. Turner. 1979, 7p
Contract W-31-109-ENG-38
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Twelve problem areas of superconducting magnets for fusion reaction are described. These are: Quench Detection and Energy Dump, Stationary Normal Region of Conductor, Current Leads, Electrical Arcing, Electrical Shorts, Conductor Joints, Forces from Unequal Currents, Eddy Current Effects, Cryostat Rupture, Vacuum Failure, Fringing Field and Instrumentation for Safety. Priorities among these areas are suggested. (ERA citation 05:017218)

CONF-791102-107 PC **A02/MF A01**
Argonne National Lab., IL.
Maintenance Considerations of the Starfire Commercial Tokamak.
C. A. Trachael, H. S. Zahn, R. E. Field, and H. C. Stevens. 1979, 7p
Contract W-31-109-ENG-38
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

An initial reactor design has been developed for the Starfire Tokamak reactor that incorporates maintenance features to permit reactor and plant operation with a 75% availability. All components of the reactor can be replaced utilizing highly automated remote maintenance techniques. Provisions for contact maintenance are included but would only be utilized on a contingency basis since it is believed that allowable dose rates will be decreased in future years. A modular design approach is used for the reactor and auxiliary subsystems to permit efficient use of remote maintenance. The modular approach minimizes the number of different maintenance operations required and can result in use of simple tasks such as push, pull, turn, etc., maneuvers for module removal. Fault isolation is provided for each replaceable module. (ERA citation 05:017265)

CONF-791102-119 PC **A02/MF A01**
Argonne National Lab., IL.
Assessment of Solid Breeding Blanket Options for Commercial Tokamak Reactors.
D. L. Smith, R. G. Clemmer, and J. W. Davis. 1979, 8p
Contract W-31-109-ENG-38
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

This study examines the materials and design implications regarding the use of solid breeding materials with respect to compatibility with structure and coolant, tritium processing, chemical and radiation stability and thermal-hydraulics. Four solid breeding materials considered, viz., Li sub 7 Pb sub 2 , Li sub 2 O, Li sub 2 SiO sub 3 and LiAlO sub 2 , are representative of the metallic and ceramic compounds available. The major design problems regarding the use of solid breeding materials relate to the limited range of operating temperatures acceptable for tritium release and chemical stability or compatibility. The allowable ranges of breeder temperatures for which in-situ tritium recovery is potentially viable are evaluated for the candidate breeding materials. (ERA citation 05:017216)

CONF-791135-8 PC **A02/MF A01**
Argonne National Lab., IL.
X-Ray and Pressure Conditions on the First Wall of a Particle Beam Inertial Confinement Reactor.
G. R. Magelssen. 1979, 19p
Contract W-31-109-ENG-38
21. annual meeting of the American Physical Society, Boston, MA, USA, 12 Nov 1979.

Because of the presence of a chamber gas in a particle beam reactor cavity, nonneutron target debris created from thermonuclear burn will be modified or stopped before it reaches the first reactor wall. The resulting modified spectra and pulse lengths of the debris need to be calculated to determine first wall effects. Further, the cavity overpressure created by the momentum and energy exchange between the debris and gas must also be calculated to determine its effect. The purpose of this paper is to present results of the debris-background gas problem obtained with a one fluid, two temperature plasma hydrodynamic computer code model which includes multifrequency radiation transport. Spherical symmetry, ideal gas equation of state, and LTE for each radiation frequency group were assumed. The transport of debris ions was not included and all the debris energy was assumed to be in radiation. The calculated x-ray spectra and pulse lengths and the background overpressure are presented. (ERA citation 05:017267)

DOE/TIC-11094 PC **A03/MF A01**
Oak Ridge National Lab., TN.
Supporting Material for EBT-P Review Presentation at DOE Germantown, 9-11 January 1980: Working Notes.
J. Sheffield. 1980, 38p
Contract W-7405-ENG-26

This memorandum reviews the EBT theory of Hedrick et al., and using a model of the EBT-1/S plasma simplifies the transport equations to a few relations involving the radial electric field, radial flow, diffusion coefficients, input power and measured plasma parameters. A summary is given of EBT-1/S experimental data with reference data sets and best data sets. Theory and experiment are compared and it is shown that the electron diffusion is classical within a factor of 1.5. The proposed EBT-1/S program is reviewed and it is shown how it is designed to provide information for EBT-P in a timely fashion and fill in the gaps of knowledge in the EBT-1/S studies. Finally a brief discussion is given of EBT-Q and it is shown how the EBT-P program is designed to provide information for this ignition device. (ERA citation 05:014538)

DOE-tr-218 PC **A02/MF A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Survey of Thermonuclear Instabilities in a Tokamak.
A. B. Mikhaylovskii. 1979, 24p
Translation source information not available.

The results of the linear theory of the cyclotron instability of trapped alpha particles are discussed. The quasi-linear theory of this instability is described. Drift thermonuclear instabilities are then described along with Alfven instabilities caused by the peak on their energy distribution function. The cyclotron Alfven instability is then described. (ERA citation 05:014552)

JAERI-M-7262 PC **A09/MF A01**
Japan Atomic Energy Research Inst., Tokyo.
Design Study of a Neutral Beam Injection System for the JAERI Experimental Fusion Reactor (JXFR).
Oct 77, 196p
In Japanese.
U.S. Sales Only.

Design study has been made of a 200 kV, 45 MW D exp 0 neutral beam injection system for the JAERI Experimental Fusion Reactor (JXFR) covering the following: determination of the ion source specifications, design of components such as ion source with extraction electrodes, energy converter, cryopump and cooling system, and estimations of the energy conversion efficiency, overall power efficiency and total power required for operation of the NBI system, and also a hydrogen isotope separation method using cryo-sorption pumps. Optimizations and parameter studies of the neutralizing cell length, gas flow rate, operating pressure of ion sources, total pumping speed and pressure of energy converters are made in the design study based on reactor plasma requirements. Hollow cathode ion sources are proposed because of the extended operation time at low gas pressure (about 4.5 x 10 exp -3 Torr) and the high gas efficiency (40%). Life of the extraction electrodes is determined by blistering due to deuterium ions. Fast neutron radiation damage is relatively small. In-line direct converters with grounded recovery electrodes and neutralizing cells floated at negative potential -190 kV are used to recover residual deuterium ion energy without interrupting the neutral beam trajectories. Energy conversion efficiency of 80% and overall power efficiency of about 40% are obtained. (Atomindex citation 09:405809)

JAERI-M-7298 PC **A10/MF A01**
Japan Atomic Energy Research Inst., Tokyo.
Design Study of Superconducting Toroidal Magnet for Tokamak Experimental Fusion Reactor.
Oct 77, 219p
In Japanese.
U.S. Sales Only.

Design study of the superconducting toroidal magnet for the Tokamak experimental fusion reactor has been carried out. Performed here were conductor design, magnetic field calculation, design of coil support, stress analysis, design of refrigeration system and safety analysis. The maximum toroidal field at the coil is 12.0 T, providing 6.0 T at the plasma center. The coil bore is 7.3 x 11.2 m, and the coil shape is deformed constant-tension D-shape. 16 coil design was chosen, considering the necessity for good access for the evacuation port or the support structure of blanket and shield. The maximum field ripple obtained in the plasma region is 0.47%. The operational current is 25,100 amperes, and the cryogenic stabilization is fulfilled. Nb sub 3 Sn superconductor was chosen in spite of its brittleness, to attain a toroidal field of 12 T which is higher than a practical limit for NbTi superconductor. The development of large Nb sub 3 Sn coil technology would be necessary to realize an economic fusion power reactor. (Atomindex citation 09:405810)

LA-8185-MS PC **A03/MF A01**
Los Alamos Scientific Lab., NM.

Comparison of Zero-Dimensional and One-Dimensional Thermonuclear Burn Computations for the Reversed-Field Pinch Reactor (RFPR).
R. A. Nebel, R. L. Hagenson, R. W. Moses, and R. A. Krakowski. Jan 80, 41p
Contract W-7405-ENG-36

Conceptual fusion reactor designs of the Reversed-Field Pinch Reactor (RFPR) have been based on profile-averaged zero-dimensional (point) plasma models. The plasma response/performance that has been predicted by the point plasma model is re-examined by a comprehensive one-dimensional (radial) burn code that has been developed and parametrically evaluated for the RFPR. Agreement is good between the zero-dimensional and one-dimensional models, giving more confidence in the RFPR design point reported previously from the zero-dimensional analysis. (ERA citation 05:017188)

LA-8186-MS PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Dense Z-Pinch (DZP) As a Fusion Power Reactor: Preliminary Scaling Calculations and Sysems Energy Balance.
R. L. Hagenson, A. S. Tai, R. A. Krakowski, and R. W. Moses. Jan 80, 53p
Contract W-7405-ENG-36

A conceptual DT fusion reactor concept is described that is based upon the dense Z-pinch (DZP). This study emphasizes plasma modeling and the parametric assessment of the reactor energy balance. To this end simple analytic and numerical models have been developed and evaluated. The resulting optimal reactor operating point promises a high-Q, low-yield system of a scale that may allow the use of conventional high-voltage Marx/water-line technology to drive a potentially very small reactor system. (ERA citation 05:014555)

LBL-10084 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
DIII Neutral Beam Shielding.
R. DeWitt, and W. Low. Oct 79, 7p CONF-791102-133
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

It appears that neutral beam heating will be the most viable method of raising the temperature of a plasma for some time to come. In fact, neutral beams may continue to be one stage of the heating program indefinitely. However, the external field, called the fringe field, of a Tokamak can impair the effectiveness and operation of the ion source and beam. Remember, a Tokamak is a large, air-core transformer coupled with a solenoid. The design process is summarized from start to finish. The source shield is used by way of example. Various parameters are examined and related to the design requirements. The different alloys are compared and the reader can follow the logic for the choice of material. (ERA citation 05:017237)

LBL-10086 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Development of 120 keV Neutral Beam Injectors.
K. H. Berkner, C. F. Burrell, W. S. Cooper, K. W. Ehlers, and A. F. Lietzke. Nov 79, 4p CONF-791102-135
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

Recent development efforts on 120-keV ion sources for neutral-beam systems for the fusion program have focused on producing pulse-lengths longer than the 0.5-sec originally specified for TFTR and improvement of the atomic-ion fraction of the beam. From heat-load measurements of the accelerator grids we deduce that our edge cooled grids should be capable of operation for pulse lengths of the order of 2 seconds; we have operated our 8- x 10-cm accelerator for 1.5-seconds and have fabricated a water-cooled accelerator for longer pulse operation. A multi-cusp ion source has been used to produce 65A beams with D exp + fractions of about 75%. (ERA citation 05:017239)

LBL-10095 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Mechanical Design and Fabrication of a Convectively Cooled Ion Accelerator for Continuously Operating Neutral Beam Systems.
J. A. Paterson, G. W. Koehler, R. P. Wells, and L. A. Biagi. Nov 79, 6p CONF-791102-125
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The details of a prototype 120 keV, 15 A accelerator designed for continuous operation are described. The molybdenum grids are convectively cooled by flowing water through individual grid rails and the thermal expansions are accommodated by the rail support modules. The design of these modules is such as to allow deflection and rotation at the grid rail ends, each rail being free to move independent of its neighbors. The results of structural analyses on the grids are presented along with the details of the fabrication techniques employed. A description of the cooling water system designed for this accelerator is also presented. (ERA citation 05:017242)

LBL-10238 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Formation of a Compact Torus Using a Toroidal Plasma Gun.
M. A. Levine, and P. A. Pincosy. Dec 79, 5p CONF-791225-6
Contract W-7405-ENG-48
Symposium on compact toruses and energetic particle injection, Princeton, NJ, USA, 11 Dec 1979.

Myers, Levine and Pincosy report results using a toroidal plasma gun. The device differs from the usual coaxial plasma gun in the use of a strong toroidal bias current for enhanced efficiency, a pair of disk-like accelerating electrodes for reduced viscosity and a fast pulsed toroidal gas valve for more effective use of the injected gas sample. In addition, a technique is used for generating a toroidal current in the plasma ring. The combination offers an opportunity to deliver a plasma with a large amount of energy and to vary the density and relative toroidal and poloidal magnetic field intensities over a range of values. It is the purpose of this paper to report further experimental results, to project the gun's applications to the formation of a compact torus and to propose a simple modification of the present apparatus as a test. (ERA citation 05:017243)

MATT-1(Sup.8) PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Bibliography of Plasma Physics Laboratory Publications and Reports, January 1-December 31, 1979.
Jan 80, 18p
Contract EY-76-C-02-3073

This bibliography contains approximately 112 references of work that covers the period January through December 1979. (ERA citation 05:014527)

N80-22081/7 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
A Combination of Permanent Magnet and Magnetic Coil for a Large Diameter Ion Source.
J. Uramoto. Feb 80, 16p IPPJ-440

A large diameter ion source for fast neutral beam injection is designed under a magnetic field composed of a circular ferrite permanent magnet and a usual coreless magnetic coil. As the magnetic field is reduced abruptly in a discharge anode, an ion source with a uniform ion current density over a large diameter is produced easily without a 'button' of ORNL duoPIGatron type ion source (a floating electrode to diffuse an axial plasma flow radially).

N80-22082/5 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Control of Horizontal Plasma Position by Feedforward-Feedback System with Digital Computer in the Jipp T-2 Tokamak.
K. Toi, K. Sakurai, S. Itoh, K. Matsuura, and S. Tanahashi. Feb 80, 29p IPPJ-441

The confinement of high temperature, high density plasma and the control of the horizontal plasma position in a resistive shell tokamak, JIPP T-11, is reported by calculating the equilibrium equation of a large aspect ratio tokamak plasma, surrounded by a thin resistive shell of a skin time of 5.2 msec, every 1.39 msec with a digital computer. The required strength of the vertical field is determined by the control demand of two groups: a feedback term expressed by the deviation of plasma position from the desired one and proportion-integration-differentiation correction, and a feedforward term which is in proportion to the plasma current. The basic equations for the control of plasma position, derived from the tokamak equilibrium theory, are presented. The control system with the digital computer for tokamak equilibrium in JIPP T-11 is described along with the control system of horizontal plasma position.

ORNL/TM-7074 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
High N Ballooning Modes in Highly Elongated Tokamaks.
C. H. An, and G. Bateman. Feb 80, 51p
Contract W-7405-ENG-26

An analytic study of stability against high n ballooning modes in highly elongated axisymmetric plasmas is presented and compared with computational results. From the equation for the marginal pressure gradient, it is found that the local shear plays an important role on the stability of elongated and shifted plasma, and that high elongation deteriorates the stability by decreasing the stabilizing effects of field line bending and local shear. The net contribution of the local shear to stability decreases with elongation and shift for strongly ballooning modes (eigenfunctions strongly localized near the outer edge of the toroidal flux surfaces) but increases for interchange modes (eigenfunctions more uniform along the flux surfaces). The computational study of high n ballooning modes in a highly elongated plasma reveals that lowering the aspect ratio and broadening the pressure profile enhance the marginal beta for beta /sub p/ less than unity but severely reduce the marginal beta for beta /sub p/ larger than unity. (ERA citation 05:017201)

ORNL/TM-7159 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Microwave Coupling in EBT Reactor.
N. A. Uckan, T. Uckan, and R. A. Dandl. Feb 80, 19p
Contract W-7405-ENG-26

For a typical size ELMO Bumpy Torus (EBT) reactor (approx. 1000 MWe), microwave frequencies required lie in the range of 60 to 110 GHz at power levels of 50 to 75 MW. As the frequency rises, the unloaded cavity (i.e., without plasma) quality factor Q decreases. Because of the short wavelengths of microwave heating power and the large cavity dimensions of a reactor, it is possible to apply quasi-optical principles in the efficient coupling of power to the plasma. The use of a confocal Fabry-Perot resonator with spherical mirrors is discussed; these serve to confine the microwave power to the region occupied by the plasma. The potential advantages of these resonators include high efficiency utilization of microwave power, minimal thermal burden on the cryopumping system, and significant benefit in preventing microwave leakage from the device. An estimation of the unloaded cavity quality factor Q and the design considerations of Fabry-Perot resonator are given. (ERA citation 05:014531)

ORNL/TM-7161 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Nonlinear Coupling of Tearing Modes with Self-Consistent Resistivity Evolution in Tokamaks.
B. Carreras, H. R. Hicks, J. A. Holmes, and B. V. Waddell. Feb 80, 72p
Contract W-7405-ENG-26

The nonlinear interaction of tearing modes of different helicity is studied for realistic values of the tokamak parameters of resistivity and parallel heat conduction. The self-consistent evolution of the resistivity is taken into account through the electron heat conduction equation. For equilibrium q profiles inferred from electron temperature profile measured before a tokamak disruption, the essential result is that the (m = 2; n = 1) model nonlinearly destabilizes other modes on a rapid time scale. Because of the development of magnetic islands of different helicity, the toroidal current density is severely deformed. These islands overlap

and field lines become stochastic in a sizable plasma volume, flattening the temperature profile in this region through parallel heat transport. The deformation of the toroidal current produces a rapid decrease in the self-inductance of the plasma, and the voltage at the limiter decreases, becoming increasingly negative. An extensive survey of equilibria and initial conditions has been conducted, and a simple prescription for their nonlinear stability properties is given. (ERA citation 05:017202)

ORNL/TM-7198 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Applicability of High-N Ballooning Theory.
L. A. Charlton, D. B. Nelson, and R. A. Dory. Feb 80, 13p
Contract W-7405-ENG-26

An axisymmetric Tokamak equilibrium has been found for which the 1/n correction term to ballooning theory is as large as the (1/n) exp 0 term. It is concluded that improvements to the theory are needed to assess stability of such an equilibrium. (ERA citation 05:017203)

PPPL-1608 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
One-Dimensional Transport Code Modelling of the Limiter-Divertor Region in Tokamaks.
J. M. Ogden, D. E. Post, R. V. Jensen, and F. G. P. Seidl. Feb 80, 42p
Contract EY-76-C-02-3073

A model of the limiter-divertor scrape-off region has been incorporated into the BALDUR one-dimensional tokamak transport code. Simulations of PDX and ALCATOR have been carried out for ohmic and neutral beam heated cases. In particular, we have studied how the edge conditions and energy loss mechanisms of PDX depend upon plasma density, and compared our results with analytic estimates. The sensitivity of the results to changes in the transport coefficients and scrape-off model is also discussed. (ERA citation 05:014541)

PPPL-1619 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Enhanced Transport in Tokamaks Due to Toroidal Ripple.
A. H. Boozer. Jan 80, 36p
Contract EY-76-C-02-3073

A method for evaluating transport in non-symmetric systems is developed and applied to a previously unstudied ripple collisionality regime of tokamaks. This collisionality regime, the ripple plateau, is the regime of primary importance both for present day and reactor scale tokamaks. The results can be directly applied to related systems like the toroidal Z pinch. (ERA citation 05:014542)

PPPL-1629 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Technique for Measuring Cooling Patterns in Ion Source Grids by Infrared Scanning.
L. R. Grisham, H. P. Eubank, and H. W. Kugel. Feb 80, 14p
Contract EY-76-C-02-3073

Many plasma sources designed for neutral beam injection heating of plasmas now employ copper beam acceleration grids which are water-cooled by small capillary tubes fed from one or more headers. To prevent thermally-induced warpage of these grids it is essential that one be able to detect inhomogeneities in the cooling. Due to the very strong thermal coupling between adjacent cooling lines and the concomitant rapid equilibration times, it is not practical to make such measurements in a direct manner with a contact thermometer. We have developed a technique whereby we send a burst of hot water through an initially cool grid, followed by a burst of cool water, and record the transient thermal behavior usng an infrared television camera. This technique, which would be useful for any system with cooling paths that are strongly coupled thermally, has been applied to a number of sources built for the PLT and PDX tokamaks, and has proven highly effective in locating cooling deficiencies and blocked capillary tubes. (ERA citation 05:014563)

PPPL-1635 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Nonlinear Saturation of the Internal Kink Mode.
W. Park, D. A. Monticello, R. B. White, and S. C. Jardin. Feb 80, 20p
Contract EY-76-C-02-3073

A numerical study shows that in a cylindrical tokamak the internal kink mode (m = 1) develops nonlinearly into a helical equilibrium state that possesses a singular current sheet. In the large aspect ratio limit, the neighboring equilibria obtained agree well with the asymptotic analytic theory of Rosenbluth et al. (ERA citation 05:014551)

PPPL-1637 PC **A04**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Effects of Toroidal Field Ripple on Suprathermal Ions in Tokamak Plasmas.
R. J. Goldston, and H. H. Towner. Feb 80, 54p
Contract EY-76-C-02-3073

Analytic calculations of three important effects of toroidal field ripple on suprathermal ions in tokamak plasmas are presented. In the first process, collisional ripple-trapping, beam ions become trapped in local magnetic wells near their banana tips due to pitch-angle scattering as they traverse the ripple on barely unripple-trapped orbits. In the second process, collisionless rippie-trapping, near-perpendicular untrapped ions are captured (again near a banana tip) due to their finite orbits, which carry them out into regions of higher ripple. In the third process, banana-drift diffusion, fast-ion banana orbits fail to close precisely, due to a ripple-induced variable lingering period near the banana tips. These three mechanisms lead to substantial radial transport of banana-trapped, neutral-beam-injected ions when the quantity alpha * identical with epsilon/sin theta/Nqdelta is of order unity or smaller. (ERA citation 05:017190)

SAN-2172-1 PC **A04**/MF **A01**
SpectraVision, Inc., Santa Monica, CA.
Study of Non-Electric Applications of Fusion Power. Final Technical Report.
R. M. Salter. Oct 79, 63p
Contract ET-78-C-03-2172

The overall context for non-electric applications of fusion power is examined. Smaller reactors favored as more compatible with co-processing and co-generation modes. For financial, environmental, and engineering reasons fusion power appears more suitably sited within industrial/chemical complexes rather than in utilities framework. Ways to use potential of 14 MeV fusion neutrons to advantage discussed including transmutation, radiolysis, reactor by-products, and high temperature features (and combinations thereof). Specialized uses generally do not enjoy sufficient market to bolster fusion program. Mundane uses such as low-temperature heat for alcohol plants, paper mills, etc., may warrant much lower fusion reactor power level economic break-even point. (ERA citation 05:015027)

SAND-79-2113C PC **A02**/MF **A01**
EG and G, Inc., Albuquerque, NM.
PBFA Control and Monitor System.
J. L. Harrison. Oct 79, 23p CONF-7910118-1
Contract EY-76-C-04-0789
Minicomputer colloquium, Las Vegas, NV, USA, 24 Oct 1979.

The Control/Monitor system, built by the Kirtland Operation of EG and G's Energy Measurements Group for Sandia Laboratories' Particle Beam Fusion Accelerator, will use a distributed-microprocessor system interfaced to a minicomputer. The major purpose for the microprocessors and minicomputers is to organize the operation of the accelerator into systematic, preplanned sequences that will maximize the scientific output of the facility. (ERA citation 05:014568)

SAND-80-0051C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Pulselac Program.
S. Humphries, Jr., J. R. Freeman, G. W. Kuswa, C. W. Mendel, and J. W. Poukey. 1979, 7p
CONF-7910122-2
Contract EY-76-C-04-0789
Heavy ion fusion workshop, Berkeley, CA, USA, 29 Oct 1979.

The Pulselac Program at Sandia Laboratories is a recent addition to the Heavy Ion Fusion Program. The purpose of this paper is to give a brief introduction to the work performed to date and future plans for the development of high current accelerators. The basis of the program is the investigation of practical methods of neutralizing the space charge of intense ion beams both in accelerating and transport regions. Alleviation of space charge constraints on ion beam transport would open up a broad range of new options for accelerator fusion drivers. The method to be employed is the introduction of electrons from external sources into the volume of the ion beam, allowing the relaxation towards a state of lower potential energy. Both the spatial location and velocity distribution of the electrons must be controlled. Our approach is to utilize weak magnetic fields, which have negligible effect on the ion orbits, to accomplish this. The program has two major goals. The first is to gain an understanding of the general phenomenon of beam neutralization. The second is to demonstrate the technological feasibility of the utilization of these principles to produce multi-kiloampere ion beams in a controlled and reproducible manner. (ERA citation 05:014569)

UCRL-15175 PC **A03**/MF **A01**
General Dynamics, San Diego, CA. Convair Div.
Evaluation of Two Polyurethane Resins for Injection Shimming of the MFTF Magnet.
V. Y. Steger, and D. S. Ring. Jan 80, 30p CASD-LLL-79-004
Contract W-7405-ENG-48

This work was conducted to support selection of a filler for the injection shimming of the MFTF Magnet (Reference 1). Two candidate polyurethanes (Pplycast RG256-57-3 and Polycast 1009-78 manufactured by CPR Upjohn Co.) were evaluated with respect to their physical and mechanical properties. Physical properties examined include thermal contraction, viscosity, and cure shrinkage. Mechanical properties include thermal shock resistance, compression modulus, and compression strength at LH sub 2 temperature. (ERA citation 05:017222)

UCRL-50021-78(V.1) PC **A11**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Laser Program. Annual Report, 1978.
M. J. Monsler, and B. D. Jarman. Mar 79, 243p
Contract W-7405-ENG-48

An overview of the entire program is given. The overview previews the report, highlights progress in 1978, and summarizes the facilities and resources of the laser program. The Argus, Shiva, and Nova facilities are described. The theory of fusion target design is discussed along with specialized techniques of target fabrication. (ERA citation 05:014571)

UCRL-50021-78(V.2) PC **A12**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Laser Program. Annual Report, 1978.
M. J. Monsler, and B. D. Jarman. Mar 79, 254p
Contract W-7405-ENG-48

This volume details the year's experiments, data, and analysis. The technology development programs required for the high performance needed in target diagnostic instrumentation and in solid state laser components are reviewed. (ERA citation 05:014572)

UCRL-82765 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Magnetic Confinement in Plasmas in Nuclear Devices.
C. G. Tull. 12 Jul 79, 13p CONF-790698-3
Contract W-7405-ENG-48
Society of Women Engineers national student conference, San Francisco, CA, USA, 27 Jun 1979.

The main emphasis of the magnetic fusion energy research program today lies in the development of two types of confinement schemes: magnetic mirrors and tokamaks. Experimental programs for both of these confinement schemes have shown steady progress toward achieving fusion power breakeven. The scaling of the current machines to a reactor operating regime and newly developed

methods for plasma heating will very likely produce power breakeven within the next decade. Predictions are that the efficiency in a fusion power plant should exceed 32%. (ERA citation 05:017215)

UCRL-82830 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Measurements of Laser Parameters for the Shiva Laser Fusion Facility.
R. G. Ozarski. 18 Sep 79, 27p
Contract W-7405-ENG-48

Large laser systems require numerous laser diagnostics to provide configuration, performance and maintenance data to permit efficient operation. The following diagnostics for a large laser system named Shiva are discussed: (1) description of Shiva laser system, (2) what measurements are desired and or required and why, (3) what measurement techniques and packages are employed and a brief description of the operating principles of the sensors employed, and (4) the laser diagnostic data acquisition and display system. (ERA citation 05:014574)

UCRL-82874 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Fiber Optics in Neutral Beam Control on the TMX Experiment at LLL.
G. G. Pollock. 12 Nov 79, 6p CONF-791102-102
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The neutral beams on the TMX experiment make extensive use of fiber optics for control and monitoring. Over 200 individual links are used, spanning a wide range of lengths, data rates, and implementation techniques. The objectives of high voltage isolation, EMI immunity and ground loop avoidance were successfully achieved. The fiber optics introduced some problems of their own, principally in mechanical survival of the fibers and in posing subtle interdisciplinary problems to designers. This paper will describe the various types of lines used and their implementation. Problems unique to fiber optics and alternative approaches will be discussed. (ERA citation 05:014564)

UCRL-82916 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Mechanical Design and Installation of the TMX Injector System.
D. D. Lang, M. O. Calderon, and K. Gillespie. 1 Nov 79, 5p CONF-791102-100
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The injector system for the Tandem Mirror Experiment at Lawrence Livermore Laboratory is used to create, heat and maintain the magnetically-confined, deuterium plasma. This paper extends Calderon's original description of the mechanical aspects of the TMX injector system, and covers new developments now that it is installed and functioning. The startup target plasma is supplied by four titanium-washer-type, streaming-plasma guns. An alternate method of establishing the target plasma has been incorporated, which uses four, 2XIIB electron-beam guns to ionize the deuterium gas supplied by the gas stabilization system. The plasma is heated and maintained by the injection of high-energy, neutral deuterium atoms into the target plasma, where they are ionized, and magnetically confined. These high-energy deuterium atoms are produced by sixteen 20-keV injectors and eight 40-keV injectors. The gas-stabilization system is used to feed cold deuterium gas into the plasma to form a cold plasma sheath that helps stabilize the hot, dense plasma. (ERA citation 05:014565)

UCRL-82936 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Hierarchically Structured Distributed Microprocessor Network for Control.
J. R. Greenwood, F. W. Holloway, P. R. Rupert, R. G. Ozarski, and G. J. Suski. 6 Jul 79, 13p
CONF-7908104-1
Contract W-7405-ENG-48
Rocky Mountain symposium, Fort Collins, CO, USA, 19 Aug 1979.

To satisfy a broad range of control-analysis and data-acquisition requirements for Shiva, a hierarchical, computer-based, modular-distributed control system was designed. This system handles the more than 3000 control elements and 1000 data acquisition units in a severe high-voltage, high-current environment. The control system design gives one a flexible and reliable configuration to meet the development milestones for Shiva within critical time limits. (ERA citation 05:014575)

UCRL-82939 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Startup of the TMX Neutral Beam System.
T. F. Wieskamp, and L. J. Mooney. 12 Nov 79, 6p CONF-791102-103
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The beam system and some of the problems encountered and solutions implemented during the construction and start-up are described. We will point out difficulties in going from a prototype test stand to 24 production neutral beam systems installed and operational. We will describe the quality control and maintenance procedures developed in order to achieve system reliability. We will discuss difficulties encountered in adapting commercial equipment for use in the neutral beam system, and we will describe the methodology of approaching interchangeability of components and spare parts inventory. We will discuss problems encountered in protecting the overall TMX against transients produced by the beam system and we will discuss solutions to oscillation problems encountered in TMX. Finally, we will present the more recent operating data for TMX neutral beam system and discuss how it impacts the operation of the rest of the TMX facility. (ERA citation 05:014566)

UCRL-82952 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
MFTF Exception Handling System.
D. M. Nowell, and G. D. Bridgeman. 12 Nov 79, 5p CONF-791102-111
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

In the design of large experimental control systems, a major concern is ensuring that operators are quickly alerted to emergency or other exceptional conditions and that they are provided with sufficient information to respond adequately. This paper describes how the MFTF exception handling system satisfies these requirements. Conceptually exceptions are divided into one of two classes. Those which affect command status by producing an abort or suspend condition and those which fall into a softer notification category of report only or operator acknowledgement requirement. Additionally, an operator may choose to accept an exception condition as operational, or turn off monitoring for sensors determined to be malfunctioning. Control panels and displays used in operator response to exceptions are described. (ERA citation 05:017251)

UCRL-82953 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Code Determination of Tolerable Accel Current and Voltage Limits During Startup of an 80 KV MFTF Sustaining Neutral Beam Source.
D. J. Mayhall, and R. D. Eckard. 12 Nov 79, 5p CONF-791102-114
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

We have used a Lawrence Livermore Laboratory (LLL) version of the WOLF ion source extractor design computer code to determine tolerable accel current and voltage limits during startup of a prototype 80 kV Mirror Fusion Test Facility (MFTF) sustaining neutral beam source. Arc current limits are also estimated. The source extractor has gaps of 0.236, 0.721, and 0.155 cm. The effective ion mass is 2.77 AMU. The measured optimum accel current density is 0.266 A/cm exp 2 . The gradient grid electrode runs at 5/6 V/sub a/ (accel voltage). The suppressor electrode voltage is zero for V/sub a/ $<$ 3 kV and -3 kV for V/sub a/ greater than or equal to 3 kV. The accel current density for optimum beam divergence is obtained for 1 less than or equal to V/sub a/ less than or equal to 80 kV, as are the beam divergence and emittance. (ERA citation 05:017245)

UCRL-82955 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Overview of MFTF Supervisory Control and Diagnostics System Software.
W. C. Ng. 12 Nov 79, 5p CONF-791102-108
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The Mirror Fusion Test Facility (MFTF) at the Lawrence Livermore Laboratory (LLL) is currently the largest mirror fusion research project in the world. Its Control and Diagnostics System is handled by a distributed computer network consisting of nine Interdata minicomputer systems and about 65 microprocessors. One of the design requirements is tolerance of single-point failure. If one of the computer systems becomes inoperative, the experiment can still be carried out, although the system responsiveness to operator command may be degraded. In a normal experiment cycle, the researcher can examine the result of the previous experiment, change any control parameter, fire a shot, collect four million bytes of diagnostics data, perform intershot analysis, and have the result presented - all within five minutes. The software approach adopted for the Supervisory Control and Diagnostics System features chief programmer teams and structured programming. Pascal is the standard programming language in this project. (ERA citation 05:017273)

UCRL-82957 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Results of Studies Performed on the Model of the MFTF Supervisory Control and Diagnostics System (SCDS).
R. H. Wyman. 12 Nov 79, 5p CONF-791102-118
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The design and implementation of the SCDS is a relatively complex problem involving a nine-computer network coupled with a unique color graphics control console system, 50 local control minicomputers, and the usual array of drives, printers, magnetic tapes, etc. Four million bytes of data are to be collected on each MFTF cycle with a repetition rate of five minutes per shot, and the associated data processing and storing load is a major concern. Crude paper studies were made initially to try to size the various components of the system and various configurations were proposed and analyzed prior to the solicitation for the computer system. However, once the hardware was purchased and a preliminary software design was completed, it became essential and feasible to do an analysis of the system to considerably greater depth in order to identify bottlenecks and other system problems and to verify those parts of the design that met the MFTF requirements. (ERA citation 05:017274)

UCRL-82963 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Date Base Management System for the MFTF.
J. H. Choy, and J. A. Wade. 12 Nov 79, 5p CONF-791102-116
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The data base management system (DBMS) for the Mirror Fusion Test Facility (MFTF) is described as relational in nature and distributed across the nine computers of the supervisory control and diagnostics system. This paper deals with a reentrant runtime package of routines that are used to

access data items, the data structures to support the runtime package, and some of the utilities in support of the DBMS. (ERA citation 05:017276)

UCRL-82967 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
MFTF Supervisory Control and Diagnostics System Hardware.
D. N. Butner. 12 Nov 79, 4p CONF-791102-109
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The Supervisory Control and Diagnostics System (SCDS) for the Mirror Fusion Test Facility (MFTF) is a multiprocessor minicomputer system designed so that for most single-point failures, the hardware may be quickly reconfigured to provide continued operation of the experiment. The system is made up of nine Perkin-Elmer computers - a mixture of 8/32's and 7/32's. Each computer has ports on a shared memory system consisting of two independent shared memory modules. Each processor can signal other processors through hardware external to the shared memory. The system communicates with the Local Control and Instrumentation System, which consists of approximately 65 microprocessors. Each of the six system processors has facilities for communicating with a group of microprocessors; the groups consist of from four to 24 microprocessors. There are hardware switches so that if an SCDS processor communicating with a group of microprocessors fails, another SCDS processor takes over the communication. (ERA citation 05:017277)

UCRL-82973 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Beta II Field-Reversed Experiment.
R. R. Rubert, S. R. Bishop, M. O. Calderon, and A. K. Chargin. 30 Nov 79, 6p CONF-791102-99
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The purpose of the Beta II experiment is to generate and investigate field-reversed plasmas. To achieve such field configurations, we use a coaxial plasma gun using an internal poloidal field to generate the field-reversed plasma ring. The plasma gun program on Beta II has three steps: producing field-reversed plasma rings, trapping the rings in a magnetic well, and heating and sustaining the rings by neutral-beam injection. (ERA citation 05:014559)

UCRL-83952 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Filamentation of a Converging Heavy Ion Beam.
E. P. Lee, H. L. Buchanan, and M. N. Rosenbluth. 4 Feb 80, 17p CONF-7910122-9
Contract W-7405-ENG-48
Heavy ion fusion workshop, Berkeley, CA, USA, 29 Oct 1979.

A major concern in the use of heavy ion beams as igniters in pellet fusion systems is the vulnerability of the beam to the transverse filamentation instability. The undesirable consequence of this mode is the transverse heating of the beam to the extent that convergence on the pellet becomes impossible. This work considers the case of a beam injected into a gas filled reactor vessel, where finite pulse length and propagation distance play an important role in limiting growth. Two geometries are analyzed: a nonconverging case where the radius at injection is nearly equal to the desired radius at the pellet, and a converging case in which the injection radius is large and the beam is pre-focused to converge at the target. It is found that a cold beam will be severely disrupted if the product of the magnetic plasma frequency and the propagation distance is much larger than unity. (ERA citation 05:017206)

UWFDM-335 PC **A05**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Advanced Fusion Fuel Cycles and Fusion Reaction Kinetics.
G. W. Shuy. Dec 79, 83p
Contract EY-76-S-02-2272

The following four chapters are included: (1) charged particle cross section requirements for advanced fusion fuel cycle analysis, (2) theory, (3) advanced fuel cycle burn kinetics code, and (4) preliminary results of the advanced fusion fuel cycle. (ERA citation 05:017247)

UWFDM-337 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Summary of the Fusion-Fission Hybrid Fuel Cycle Analysis (Tritiumless Hybrids).
G. A. Moses. Dec 79, 34p
Contract EY-76-S-02-2272

Fusion-fission hybrid reactors offer the opportunity for fusion to impact the energy production scenario at an earlier date and in a more substantial fashion than simple fusion electricity reactors. This hypothesis is predicated on the belief that the technological problems associated with fusion-fission hybrids can be solved in a timely manner. Elimination or deferral of such systems could help to ease the introduction of fusion-fission reactors. It this summary we look at the elimination of the tritium breeding function in the fusion blanket and its effect on the early introduction of hybrid reactors. (ERA citation 05:017248)

UWFDM-344 PC **A02**/MF **A01**
Wisconsin Univ.-Madison.
Preliminary Design of the End Plug Magnet System for a Tandem Mirror Reactor.
S. O. Hong, D. C. Larbalestier, L. P. Mai, I. N. Sviatoslavsky, and I. Ojalvo. Nov 79, 7p CONF-791102-138
Contract EY-76-S-02-2272
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

A conceptual design of the end plug magnet system for a tandem mirror reactor is presented. An innovative approach is needed, particularly in the Yin Yang coil, to satisfy the requirements of an adequate mirror ratio, high field (14 to 17 Tesla), high current density and the unusual geometry. Nb sub 3 Sn superconductor is used and superfluid cooling is adopted to provide cryostability at the required high current density. The stabilizer used is high strength copper or stainless steel encased high purity aluminum. External structure is provided with heavy casings which surround the Yin Yang coils and are joined to each other at critical locations. (ERA citation 05:017223)

18B. Isotopes

DOE/EV/10010-1 PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Chemistry.
Historical exp 14 C Measurement from the Atlantic, Pacific, and Indian Oceans. Progress Report, December 1, 1978-August 31, 1979.
A. W. Fairhall. 1979, 7p
Contract EY-76-S-06-2225

Between the years 1964 and 1974, over 1000 sea water samples were collected from various locations and depths to 4000 M. These samples were processed to recover inorganic carbon (as CO sub 2) for laboratory measurement of exp 14 C. Aliquots of sea water, poisoned with mercuric chloride, were collected at the same time for total CO sub 2 measurement. During laboratory workup approximately 1/2 of the samples had small aliquots of CO sub 2 set aside for exp 13 C/ exp 12 C isotope ratio measurement. The purpose of the present project is to finalize all of this information along with the hydrographic data for each station. (ERA citation 05:012532)

DPST-79-128-5/6 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Exp 238 Pu Fuel Form Processes Bimonthly Report, May-June 1979.
Feb 80, 40p
Contract EY-76-C-09-0001

Progress in the Savannah River exp 238 Pu Fuel Form Program is summarized. Full-scale fabrication tests of General-Purpose Heat Source (GPHS) fuel forms continued in the SRL Plutonium Experimental Facility (PEF) as four additional pellets (GPHS Pellets 5-8) were hot pressed. GPHS pellets fabricated by the reference process were dimensionally and structurally stable during and after final heat treatment. Microstructural studies confirmed that centerline GPHS process conditions produce pellets with a homogeneous microstructure and a uniform density. Because of the potential for excessive metal creep in existing furnace racks, the racks were considered unacceptable for GPHS fuel production in the PuFF. To eliminate metal creep, racks containing some ceramic components were designed to operate at 1600 exp 0 C in an oxygen atmosphere for more than 100 h. The four-key variables previously identified (shard sintering temperature, hot press load, hot press temperature, and load ramp) were found to correlate with production sphere fracture tendency and bulk density. (ERA citation 05:015033)

IEA-501 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Preparation of exp 18 F in a Research Reactor, from Irradiated Lithium Carbonate.
H. T. Gariglia, and C. P. G da Silva. Jan 78, 14p
In Portuguese.
U.S. Sales Only.

A procedure for preparation of carrier-free fluorine-18 is described. The exp 18 F is produced by neutron irradiation of lithium carbonate and is separated by passing the dissolved material through a 1000 exp 0 C calcinated aluminium oxyde column. The yield is about 90%, the tritium content 2%; other radioactive impurities are not found. The radiochemical purity is about 93% and the lithium content of the solution is <0.2 ppm. (Atomindex citation 09:414032)

JINR-R-12-10881 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Volatilization of Hg, Tl, Pb and Bi Atoms Produced by Nuclear Reactions from Copper, Gold, Nickel and Graphite.
T. Reetts, B. Aikhler, Kh. Geggeler, and I. Zvara. 1977, 12p
In Russian.
U.S. Sales Only.

It was found that trace quantitites of Hg, Tl, Pb and Bi as well as probably homologous superheavy elements 112 to 115 can be extracted from Cu, Au and Ni foils 2 to 10 m thick or from graphite (500 m) with high yield by volatilization at 1000 deg C in hydrogen or helium atmosphere (apparatus made of allica) within 30 min. Separation from actinides with a factor higher than 10 exp 9 obtained. (Atomindex citation 09:407281)

NRCN-458 PC **A02**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Development of Encapsulation Process for Radioactive Sources.
F. Bendec, Y. Sharir, A. Stern, and M. J. Dapht. Dec 78, 22p
In Hebrew.
U.S. Sales Only.

A process for the encapsulation of radioactive point sources (exp 241 Am, exp 238 Pu, exp 239 Pu) and of an annular (exp 241 Am) source was developed. The sources were sealed in a stainless steel 304L envelope using automatic tungsten-inert-gas (TIG) welding machine. The welding was carried out in a glovebox specially designed for such weldings. The decontamination process, the welding parameters, and the special jigs and fixtures needed for the welding are described. (Atomindex citation 10:476830)

18C. Nuclear Explosions

AD-A083 072/9 PC **A08**/MF **A01**
Rome Air Development Center Griffiss AFB NY
Federal Aviation Administration Electromagnetic Pulse (EMP) Protection Study: A Reexamination and Update,
Chin-Lin Chen, and Warren D. Peele. Nov 79, 160p FAA-RD-80-11
Contract DOT-FA72WAI-356

In 1972, a study was performed to assess the susceptibility of the FAA system to the electromagnet-

ic pulse (EMP) phenomenon. The purpose of the present investigation is to update the previous study by incorporating existing and newly published results of EMP and its effect on new equipment. The particular EMP model which has been used is based upon the environment anticipated for a typical high altitude nuclear burst. Our method of susceptibility assessment of the system has been to determine the effectiveness of protection at each of the various types of facilities in the FAA system. These have included the control centers and supporting computer, the remote radars, short range radars, RCAG sites, the remote microwave relay sites (RML), control towers, RVR, Instrument Landing Systems, IFR rooms and related computers (ARTS III), runway and approach light systems. No effort was made to determine the susceptibility of the AT&T long lines system which supports the communications and radar data functions. At least one of each of these types of FAA facilities has been analyzed to determine effectiveness of existing building shielding (including nonconductive penetrations), the adequacy of protective devices on conductive penetrations, the adequacy of the grounding system, and the susceptibility of existing equipment to the EMP environment. The EMP threat is actually a subset of the total Electromagnetic Radiation (EMR) problem which can be overviewed as shown here.

AD-A083 332/7 PC **A07**/MF **A01**
SRI International Menlo Park CA
Laboratory Studies of Containment in Underground Nuclear Tests.
Final rept. 16 Nov 77-31 Jan 79,
J. C. Cizek, and A. L. Florence. 31 Jan 79, 143p DNA-4847F, AD-E300 726
Contract DNA001-77-C-0025

As part of the DNA stemming and containment program for underground nuclear testing, laboratory studies were performed to further develop and apply experimental techniques for assessing the effects on containment of the residual stress field surrounding an exploded cavity. A comparison of hydrofracture pressures for exploded and unexploded cavities revealed the existence of this stress field. Experimental parameter studies were conducted to provide an understanding of the mechanisms controlling containment. Sensors were developed to generate quantitative estimates of crack growth, fluid motion, and the states of stress and strain in the region surrounding a cavity during hydrofracture. The data generated provide results suitable for development of new containment theories as well as for correlation with predictions of existing computer codes. Hydrofracture pressure records were simulated by applying classical fracture mechanics theory.

AD-A083 337/6 PC **A03**/MF **A01**
Systems Science and Software La Jolla CA
DIABLO HAWK EVENT, Cavity Pressure Sensors Package Ground Shock Isolation Experiment.
Final rept. 20 Jun 77-30 Nov 78,
E. A. Day, and W. G. Ginn. 30 Nov 78, 31p SSS-R-79-3863, DNA-4807F, AD-E300 720
Contract DNA001-78-C-0166

DIABLO HAWK was an underground tunnel test to investigate the effects of a nuclear explosion on various structures and systems. Systems, Science and Software fielded an experiment to demonstrate the feasibility of mounting pressure gauges with built-in electronics in a manner to effectively isolate the ground shock and permit continuous output (pressure reading) for a period starting prior to zero time and continuing until power is terminated at the recording trailers. The shock isolation package was mounted to the end-of-stemming bulkhead located in the TAPS crosscut (the cross-drift leading to the TAPS from the by-pass drift). To evaluate the effectiveness of the shock isolation system, two high g rated accelerometers were attached to the stemming bulkhead and two lower rated accelerometers were attached inside the package. Continuous signals were recorded from each of the four accelerometers as well as from the two pressure gauges from minus two minutes until the recording trailer power was terminated at plus five minutes. The two bulkhead-mounted accelerometers showed good agreement with groundshock arrival at 72 ms after zero time and a peak acceleration of 71g. Inside the shock isolated package the first acceleration was recorded at 77 ms and the peak acceleration was 10.8g. The two package mounted accelerometer signals were essentially identical.

AD-A083 339/2 PC **A13**/MF **A01**
Science Applications Inc La Jolla CA
The ROSCOE Manual. Volume 24. Natural Clouds (Physical and Optical Properties and Statistics).
Final rept. 1 Jan 76-31 Jul 79,
R. R. Johnston, D. E. Stevenson, W. A. Aron, R. D. Moffat, and D. A. Hamlin. 31 Jul 79, 276p SAI-78-604-LJ-5-VOL-24, DNA-3964F-24, AD-E300 714
Contract DNA001-76-C-0194

The effect of natural clouds on IR observables from nuclear explosions is modeled for the wavelength range from 2 to 5 microns. A computer code for use with the ROSCOE-IR main program is provided to allow evaluation of the radiance resulting from transmission and reflection by natural clouds. Mie scattering cross-sections are calculated and used to generate transport cross-sections and bidirectional reflectance coefficients. Cloud transmission is treated by diffusion. A deterministic model allows the user to specify the cloud geometry. A statistical model allows selection of geographic weather averages and generates the probability distribution in radiance coefficients. Solar radiation and natural cloud thermal emission are treated.

AD-A083 340/0 PC **A03**/MF **A01**
Science Applications Inc La Jolla CA
A High Altitude Ionization Structure and Scintillation Model.
Final rept. 1 May 78-31 Jan 79,
David L. Sachs. 19 Feb 79, 41p SAI-023-79-562-LJ, DNA-4828F, AD-E300 711
Contract DNA001-78-C-0196

A method is described for the implementation of a time dependent striation structure and convection model into an existing systems code. The purpose is to update estimates of the scintillation effects of the structuring of the ionization of high altitude nuclear bursts on satellite radio signals. The structure and convection model is an extrapolation of the results of a numerical calculation for an idealized situation to the nuclear case combined with a late time bifurcation model.

AD-A083 485/3 PC **A03**/MF **A01**
IIT Research Inst Chicago IL
DNA EMP Awareness Course Notes. Supplement to Third Edition.
Topical rept. Jan-Jul 78,
I. N. Mindel. 31 Jul 78, 36p DNA-2772T-SUPPL, AD-E300 640
Contract DNA001-78-C-0004
Supplement to report dated Oct 77, AD-A058 367. See also AD-769 781.

These notes are primarily intended as a guide for the individual attending the DNA EMP Awareness Course. The text serves as an engineering introduction to the EMP systems design problem and provides a survey of techniques suitable for solving this hardening problem. The text discusses all aspects of EMP, from the environment through system design and testing.

BARC-968 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Strength Curves for Shales and Sandstones under Hydrostatic Confining Pressures.
S. C. Gupta, and S. K. Sikka. 1978, 7p
U.S. Sales Only.

The experimental data for the effect of confining pressures on the fracture stress have been analysed for shales and sandstones. The normalized compressive strengths are found to lie in a narrow region so that Ohnaka's equation for crystalline rocks, can be fitted to the data. The fitted parameters are physically reasonable and indicate that the functional dependence of strength on porosity, strain rate and temperature is independent of the confining pressures. (Atomindex citation 10:445546)

UCRL-52882 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
ISC Origin Times for Announced and Presumed Underground Nuclear Explosions at Several Test Sites.
H. C. Rodean. 3 Dec 79, 24p
Contract W-7405-ENG-48

Announced data for US and French underground nuclear explosions indicate that nearly all detonations have occurred within one or two tenths of a second after the minute. This report contains ISC origin-time data for announced explosions at two US test sites and one French test site, and includes similar data for presumed underground nuclear explosions at five Soviet sites. Origin-time distributions for these sites are analyzed for those events that appeared to be detonated very close to the minute. Particular attention is given to the origin times for the principal US and Soviet test sites in Nevada and Eastern Kazakhstan. The mean origin times for events at the several test sites range from 0.4 s to 2.8 s before the minute, with the earlier mean times associated with the Soviet sites and the later times with the US and French sites. These times indicate lower seismic velocities beneath the US and French sites, and higher velocities beneath the sites in the USSR 9 figures, 8 tables. (ERA citation 05:016941)

18D. Nuclear Instrumentation

AD-A083 518/1 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Off-Site Monitoring of Nuclear Fuel Reprocessing Plants for Nuclear Weapons Proliferation.
Master's thesis,
Lawrence G. Karch. Jan 80, 95p Rept no. AFIT/GNE/PH/80M-3

Techniques for off-site monitoring of foreign nuclear fuel reprocessing plants for indications of nuclear weapons proliferation are examined. Air sampling of the reprocessing plant exhaust plume and remote sensing of the stack exhaust by infrared absorption spectrometry and differential absorption LIDAR are considered. The fission product ratios: xenon/krypton, xenon/Kr-85, Xe-136/Kr-85, and I-129/I-127 are shown to be positive indicators of nuclear weapons proliferation. Off-site monitoring by air sampling alone cannot establish the fission product ratios with sufficient accuracy or certainty to detect Pu-239 isolation or U-233 production. Detection of highly burned-up LWR fuel by air sampling appears possible under favorable plant discharge and meteorological conditions. Remote sensing of the stack discharge by infrared absorption spectrometry for HI129 and HI127 appears feasible at a distance of 1 kilometer. Measurement of xenon and krypton concentrations at stack discharge using either infrared absorption spectrometry or differential absorption LIDAR is not feasible. (Author)

CEA-R-4845 PC **A05**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, 92 - Montrouge (France).
Protonation of the Hydrated Electron and Application to the Instantaneous Measurement of Dose Rate Variations.
G. Houzel. Dec 77, 80p
In French.Thesis.
U.S. Sales Only.

It is well known that pulsed radiolysis of aqueous solutions gives rise to a certain number of transient species including the hydrated electron esub(eq)sup(-) for which the yield g(esub(aq)sup(-)), has been measured and which possesses a characteristic absorption spectrum (lambdasub(max)=720nm). In sufficiently and aqueous solutions the disappearance of the hydrated electron esub(aq)sup(-) takes place mainly by the protonation reaction esub(aq)sup(-)+H exp + implies H. By measurement of the light intensity variations of a helium-neon laser beam, used as analytical light and passing through such solutions it is then possible to calculate the instantaneous values of the concentrations (esub(aq)sup(-)) and the dose rate delivered by the pulsed generator. For very short-lived pulses (a few nanoseconds) it is necessary however to account for the g(esub(aq)sup(-)) variations due to primary heterogeneities in the irradiated solutions. Experiments based on this method were used to study signals delivered by different types of electron or gamma

rays generators. An extension of this work to the study of sulphuric aqueous solutions of Cesup(IV) showed a variation in the Cesup(III) field as a function of the maximum dose rate absorbed in the solutions considered . (Atomindex citation 09:411414)

DP-1529 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Solar-Powered Environmental Data Collection System.
H. W. Randolph. Feb 80, 18p
Contract EY-76-C-09-0001

A solar-powered system consisting of a multipurpose remote data collector, a radio data link, and a data receiving station has been designed to acquire data from various remote areas at the Savannah River Plant. A prototype system has been built to monitor gamma radiation at the plant perimeter. It is operating satisfactorily and will be installed to monitor gamma radiation or other environmental parameters at many remote locations on the plant. (ERA citation 05:013598)

EUR-5916 PC **A03**/MF **A01**
Commission of the European Communities, Luxembourg.
Intercomparison of Analysis Methods for the Assay of Traces of Platinum and Palladium.
J. Pauwels. 1978, 44p
U.S. Sales Only.

This report describes experimental procedures and results of an intercomparison organized by the Commission of the European Communities, in which more than 20 laboratories participated using up to 12 different methods of analysis. The analysed samples were synthetic alloys containing 1 to 100 mu g/g Pt or Pd, which were quantitatively prepared using high-frequency levitation melting. The accuracy of the preparation method, as well as its reproducibility were demonstrated. Neutron, photon, and proton activation analysis as well as flameless atomic absorption spectroscopy come out as the most suitable analytical methods. (Atomindex citation 10:422880)

IFUSP-P-90 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica
Gamma Ray Intensity Standards for Calibrating Ge(Li) Detectors for the Energy Range 200-1700 KeV.
Dec 78, 19p
U.S. Sales Only.

Gamma ray pulse height spectra for seven radioactive sources have been analyzed for the full energy peak areas. By using these areas in conjunction with the results of an extensive compilation of relative gamma ray intensities, a relatively simple efficiency function has been used to calibrate a coaxial Ge(Li) detector. The resulting relative intensities for each source have been used in investigation the consistency of the weighted averages of the compiled relative intensities. Possible systematic errors are discussed and recommendations are made with respect to the choice of gamma ray intensity standards. (Atomindex citation 10:475899)

IFVE-OEIPK-77-141 PC **A02**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij.
Status of the Program for Geometry Reconstruction of Events in Kp Experiments at 32 GeV/C on the "Mirabelle" Bubble Chamber.
I. V. Azhinenko, Yu. A. Belokopytov, P. A. Gorbunov, L. G. Kaminskii, and S. V. Klimenko. 1977, 18p
In Russian.
U.S. Sales Only.

Main processors and logic of data processing in the geometry used in IHEP on ICL-1906A computer for Kp 32 GeV/c experiments are presented. Some details, such as choosing of internal control constants, fail processing, text keeping, etc., are described. Accuracy characteristics of geometry reconstruction and operational features are presented. (Atomindex citation 10:438412)

INIS-mf-4206 PC **A06**/MF **A01**
Karlsruhe Univ. (TH) (Germany, F.R.). Fakultaet fuer Elektrotechnik.
Discrimination of Neutrons and gamma Quanta with the Aid of Their Power Density Spectra.
R. Buchmueller. 31 Jan 77, 105p
In German.Thesis.
U.S. Sales Only.

The paper introduces a method of using only one fission chamber to discriminate the neutron flux against the gamma flux. The gamma chamber current may be several orders of magnitude higher than the neutron chamber current. In specially dimensioned fission chambers the neutrons and gamma quanta are made to generate different current pulses. Discrimination becomes possible by recording the power density spectrum of the mixture of pulses over a broad frequency range (< 5 MHz) as a result of the different power density spectra of the single pulses according to Campbell's theorem. (Atomindex citation 09:375077)

INIS-mf-4539 PC **A05**/MF **A01**
Universidad Nacional Autonoma de Mexico, Mexico City. Facultad de Ciencias.
Nuclear Traces in Glass.
Thesis (M. Sc.),
A. M. de N. Segovia. 1978, 94p
In Spanish.
U.S. Sales Only.

The charged particles produce, in dielectric materials, physical and chemical effects which make evident the damaged zone along the trajectory of the particle. This damaged zone is known as the latent trace. The latent traces can be enlarged by an etching of the detector material. This treatment attacks preferently the zones of the material where the charged particles have penetrated, producing concavities which can be observed through a low magnification optical microscope. These concavities are known as developed traces. In this work we describe the glass characteristics as a detector of the fission fragments traces. In the first chapter we present a summary of the existing basic theories to explain the formation of traces in solids. In the second chapter we describe the etching method used for the traces development. In the following chapters we determine some chatacteristics of the traces formed on the glass, such as: the development optimum time; the diameter variation of the traces and their density according to the temperature variation of the detector; the glass response to a radiation more penetrating than that of the fission fragments; the distribution of the developed traces and the existing relation between this ditribution and the fission fragments of exp 252 Cf energies. The method which has been used is simple and cheap and can be utilized in laboratories whose resources are limited. The commercial glass which has been employed allows the registration of the fission fragments and subsequently the realization of experiments which involve the counting of the traces as well as the identification of particles. (Atomindex citation 10:427351)

LA-8165-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Time Projection Spectrometer.
H. L. Anderson. Dec 79, 8p CONF-790126-5
Contract W-7405-ENG-36
LAMPF workshop on Pion Single Charge Exchange, Los Alamos, NM, USA, 22 Jan 1979.

The time projection chamber (TPC) is discussed. Its advantage is its ability to collect a great deal of information on multiparticle reactions from high-energy colliding beam experiments. The TPC makes it possible to reconstruct all the charged particles in the reaction, and it can be used for mass identification. (ERA citation 05:014114)

URR-8 PC **A03**/MF **A01**
Universities Research Reactor, Risley (England).
URR Digital Reactivity Meter Basic Programme 'RMO' And Calibration Programme 'CALIP'.
H. Bridge. Nov 78, 33p
U.S. Sales Only.

An introduction is provided to the URR digital reactivity meter using BASIC programme RMO together with detailed operating instruction and particulars of the basic equations and computer programmes. (Atomindex citation 10:463692)

18E. Nuclear Power Plants

GA-A-15501 PC **A13**/MF **A01**
General Atomic Co., San Diego, CA.
3000 MW(T) HTGR - Gas Turbine Non-Intercoolel. Technical Evaluation Report.
Dec 79, 297p
Contract AT03-76SF70046

This report summarizes all the technical work performed on the 3000-MW(t) 3-loop High-Temperature Gas-Cooled Reactor Gas Turbine design as of June 1979. Although the plant configuration has changed to a 2000-MW(t) 2-loop plant, most of the technical assessments described in this report are still applicable to the 2000-MW(t) plant. The report covers the criteria under which the plant was designed, the technical feasibility problems associated with the plant and their potential solutions, and other potential applications and improvements which could make the gas turbine concept more attractive economically. (ERA citation 05:013552)

INIS-mf-4256 PC **A02**/MF **A01**
Westinghouse Nuclear Espanola, Madrid.
Seismic and Environmental Qualification of Class IE Equipment Manufactured in Spain.
P. Gerini, A. Lumbreras, and F. Naredo. 1978, 12p CONF-7710184-2
IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

Nuclear power plant instrumentation and control design is affected by several factors such as various plant operating conditions, transient response capability, safety requirements and changes in IEEE standards. Recent upgraded IEEE standards that call for Qualification of all Safety related I anc C equipment, namely IEEE 323 (Qualifying Class IE Electric Equipment for nuclear power generating stations) and its daughter Standard IEEE 344 (Recommended Practices for Seismic Qualification of Class IE Equipment for nuclear power generating stations) have been endorsed by the United States Nuclear Regulatory Commission through the issuance of corresponding Regulatory Guides. The author describes the Qualification requirements applicable to the Class IE I and C Components made in Spain for the different vintages of plants, and the programs implemented or plans established by Westinghouse to fulfill those requirements. (Atomindex citation 09:396909)

INIS-mf-4866 PC **A02**/MF **A01**
Societe de Traction et d'Electricite, Brussels (Belgium).
Protection of Nuclear Power Plants Against External Events.
P. Kinet, and R. Roch. 1978, 9p CONF-781022-106
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only.

The paper describes the methodology of the safety design of nuclear power plants against external events with particular emphasis of the Belgian Plants. The site analysis and potential hazards evaluation are explained. The different designs incorporating various combinations of reinforced structures and dedicated systems are analysed. The particular lay-out and systems of the Belgian Plants are explained. (Atomindex citation 10:463372)

NUREG/CR-1250-V-2-PT1 PC **A14**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Three Mile Island Special Inquiry Group.
Three Mile Island: A Report to the Commissioners and to the Public. Volume II, Part 1.
5 Apr 79, 319p
See also Volume 2, Part 2, NUREG/CR-1250-V-2-PT2, and NUREG/CR-1250-V-1.

This is part one of three parts of the second volume of the Special Inquiry Group's report to the Nuclear Regulatory Commission on the accident at Three Mile Island. The first volume contained a narrative description of the accident and a discussion of the major conclusions and recommenda-

tions. This second volume is divided into three parts. Part 1 of Volume II focuses on the pre-accident licensing and regulatory background. This part includes an examination of the overall licensing and regulatory system for nuclear powerplants viewed from different perspectives: the system as it is set forth in statutes and regulations, as described in Congressional testimony, and an overview of the system as it really works. In addition, Part 1 includes the licensing, operating, and inspection history of Three Mile Island Unit 2, discussions of relevant regulatory matters, a discussion of specific precursor events related to the accident, a case study of the pressurizer design issue, and an analysis of incentives to declare commercial operation.

NUREG/CR-1338 PC **A07**/MF **A01**
Sandia Labs., Albuquerque, NM.
Allocation of NRC Inspection Effort to Risk-Related Activities in Nuclear Power Plants,
Geoffrey J. Lynch, George H. Bradley, Jr., Norman L. Brisbin, and Daniel J. Murphy, Jr. Apr 80, 128p SAND-80-0361

The inspection modules in the NRC inspection program for the Preoperational Test, Startup Test, and Operation phases of nuclear power plants were examined to assess whether manhours invested in each inspection were commensurate with the potential of these inspections for detecting conditions which would contribute significantly to risk. No basis was found in this assessment for fundamental changes to the inspection program. However, to improve program effectiveness, some modifications to specific parts of the program appear to be warranted.

NUREG/CR-1423-V-2 PC **A11**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Structural Building Response Review; Seismic Safety Margins Research Program. Volume II,
A. K. Singh, T. I. Hsu, and T. P. Khatua. May 80, 239p
Also pub. as Sargent and Lundy, Chicago, IL. Rept. no. SL-3759.

This report describes the structural response analysis method, including the structural model, soil-structure-interaction as it relates to structural models, methods for seismic structural analysis, numerical integration methods, methods for non-seismic response analysis approaches to combine various responses, structural damping values, nonlinear response, uncertainties in structural properties, and structural response analysis using random properties. The report presents the state-of-the-art in these areas for nuclear power plants. It also details the past studies made at Sargent & Lundy to evaluate different alternatives and the conclusions reached for the specific purposes that those studies were intended.

NUREG/CR-1429 PC **A13**/MF **A01**
Brookhaven National Lab., Upton, NY.
Seismic Review Table.
Final rept. Oct 79-Apr 80,
M. Subudhi, M. Reich, B. Koplik, and J. Lane. May 80, 300p

The Seismic Review Table is a summary of Engineering Design parameters that were employed in the seismic analysis and design of nuclear power plants. The table covers 71 reactors licensed to operate by the U.S.N.R.C. The information contained is listed plant by plant and consists of OBE and SSE 'g' level and Modified Mercalli Intensity; Earthquake Time History used to develop the ground response spectra or as input in the dynamic analysis; Number of Earthquake Components used and Method of Combining Them; Method of Modal Combination; Type of Ground Design Spectra; Method of Generation of Floor Response Spectra; Type of Foundation and Depth; Type, Thickness, Shear Wave Velocity and Shear Modulus Profile of the Surrounding Subgrade Soil and Bedrock; Ground Water Table Depth; nearby Dams; Modelling Method used for soil-structure interaction; Material Damping of Soil; Limitation on Modal Damping - Damping Values; and Loading Combinations, and Acceptance Criteria for Category I Structures, Mechanical Equipment, Piping, and Electrical systems. The goal of the Seismic Review Table is to provide a reference of the available information relevant to the seismic design of currently licensed nuclear power plants.

NUREG/CR-1431 PC **A13**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Detection of Damage in Structures from Changes in Their Dynamic (Modal) Properties - A Survey.
Technical evaluation rept. Sep 78-Sep 79,
Mark Richardson. Apr 80, 282p UCRL-15103
Prepared in cooperation with Structural Measurement Systems, Inc., Santa Clara, CA.

The stated object of this study was to survey the technical literature and interview selected experts in the fields of dynamic testing and analysis to determine the state-of-the-art of the relationship between physical damage to a structure and changes in its dynamic (modal) properties.

NUREG/CR-1442 PC **A08**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Verifying Seismic Design of Nuclear Reactors by Testing.
Technical evaluation rept.,
B. Barclay, J. A. Malthan, S. F. Masri, and F. B. Safford. Apr 80, 166p
Prepared in cooperation with Agbabian Associates, El Segundo, CA.

The purpose of the study is to develop a program plan to provide assurance by physical demonstration that nuclear power plants are earthquake resistant and to allow nuclear power plant operators to: (1) decide whether tests should be conducted on their facilities; (2) specify the tests that should be performed; and (3) estimate the cost of the effort to complete the recommended test program.

NUREG/CR-1443 PC **A06**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Methods and Benefits of Experimental Seismic Evaluation of Nuclear Power Plants.
Technical evaluation rept. Sep 78-Jun 79,
P. Ibanez, G. Howard, C. Smith, W. Gundy, and W. Walton. Apr 80, 125p
Prepared in cooperation with ANCO Engineers, Inc., Santa Monica, CA.

This study reviews experimental techniques, instrumentation requirements, safety considerations, and benefits of performing vibration tests on nuclear power plant containments and internal components. The emphasis is on testing to improve seismic structural models. Techniques for identification of resonant frequencies, damping, and mode shapes, are discussed. The benefits of testing with regard to increased and more accurate computer models are outlined. A test plan, schedule, and budget are presented for a typical PWR nuclear power plant.

NUREG-0090-V-2-4 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Management and Program Analysis.
Report to Congress on Abnormal Occurrences. Volume 2, Number 4.
Quarterly rept. Oct-Dec 79.
Apr 80, 27p
See also Volume 2, Number 3, NUREG-0090-V-2-3.

Section 208 of the Energy Reorganization Act of 1974 identifies an abnormal occurrence as an unscheduled incident or event which the Nuclear Regulatory Commission determines to be significant from the standpoint of public health or safety and requires a quarterly report of such events to be made to Congress. This report, the nineteenth in the series, covers the period October 1 to December 31, 1979. During the period, there was one abnormal occurrence. The event occurred at an Agreement State licensee and involved overexposure of a hot cell operator. This report also contains information updating previously reported abnormal occurrences.

PB80-903900 Subscription
Nuclear Regulatory Commission, Washington, DC. Office of Inspection and Enforcement.
Licensee Contractor and Vendor Inspection Status Report.
Quarterly repts.
1980, 4 issues
Paper copy available on subscription, North American Continent price $45.00; single copy price PC$12.50, MF$12.50; all others write for quote.

A fundamental premise of the Nuclear Regulatory Commission's (NRC) nuclear facility licensing and inspection program is that a licensee is responsible for the proper construction and safe operation of nuclear power plants. The total government-industry system for the inspection of nuclear facilities has been designed to provide for multiple levels of inspection and verification. Licensees, contractors and vendors each participate in a quality verification process in accordance with requirements prescribed by, or consistent with, NRC rules and regulations. The NRC inspects to determine whether its requirements are being met by a licensee and his contractors, while the great bulk of the inspection activity is performed by the industry within the framework of sequential, ongoing quality verification programs. In addition to providing information on inspection results, this Licensee Contractor and Vendor Inspection Status Report, the 'White Book', contains Bulletins and Circulars issued by the Office of Inspection and Enforcement during the period of time covered by each publication of the book. The White Book contains information normally used to establish a 'qualified suppliers' list; however, the information contained in this document is not adequate, nor is it intended to stand by itself, as a source of information concerning qualified suppliers.

18F. Radiation Shielding and Protection

AERE-R-9079 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Re-Analysis of Neutron Diffraction Data from UO sub 2.
M. J. Cooper, and M. Sakata. Apr 79, 24p
U.S. Sales Only.

The results of a re-analysis of recent single crystal and powder neutron diffraction data from UO2 are presented and discussed. It is shown that apparent inconsistencies in the results of previous analyses of these data arose from differences between the values assumed for some of the parameters and that the various sets of data are in fact extremely consistent. These data also provide a more accurate value for the ratio of the scattering amplitudes, i.e. bU/bO = 1.451(2), which gives a value for bU = 0.842(2) x 10(-12) cm on the assumption of a value for b0 = 0.5805(11) x 10(-12) cm. The temperature factors for the atoms at room temperature are determined to be BU = 0.23(1)Angstrom and BO = 0.44(1)Angstrom. (Atomindex citation 10:488963)

CEGB-RD/B/N-4232 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Perspective on Potential Contributions to Reactor Decommissioning Problems Caused by Nickel-59.
P. B. Woollam. Sep 78, 8p
U.S. Sales Only.

A recent, widely publicized, report by the New York Public Interest Research Group concluded that dose equivalent rates in a BWR, due to exp 59 Ni, were 150 Sv h exp -1 (15000 rem h exp -1) at the end of life. Consequently a decay period of 1.5 million years was required for activity to reduce a "safe level". This note shows that these results are entirely fallacious and that the maximum dose equivalent rate due to exp 59 Ni in a decommissioned Magnox reactor will be less that 10 Sv h exp -1 (1 mrem h exp -1). In addition, exp 59 Ni is not a major isotope to be considered in calculations of ingestion via drinking water for a period of 1000 y after reactor shutdown. (Atomindex citation 10:463393)

EFI-231(24)-77 PC **A02**/MF **A01**
Erevanskij Fizicheskij Inst. (USSR).
Analysis of Calorimetric Nuclear Cascades at 50-5.10 exp 3 GeV.
M. J. Keropyan. 1977, 21p
In Russian.
U.S. Sales Only.

The characteristics of nuclear-electron cascade showers generated in iron and lead in the energy range of 50-5000 GeV are studied. The experimental data obtained on the "Aragatic ionizing calorimeter", "Beam" and "Pion" installations are analyzed. The single-column nuclear-electron showers (3868 events) are selected. The absorption path La(E) of the energy flux in a cascade shower and the most probable values of shower penetration into the calorimeter depth are obtained. The values characterizing shower size and energy flux absorption, depend on the "primary" hadron energy incident on the installation and on the target-nucleus dimensions. The Monte-Carlo calculations are compared with experimental results. (Atomindex citation 10:440190)

INIS-mf-4962 PC **A02**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA.
Probabilistic Treatment of a PWR Containment Integrity Analysis.
R. H. Mark. 1978, 12p CONF-781022-107
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only.

The design analysis for the LOCA (Loss of Coolant Accident) mass and energy release transient and the containment peak pressure transient contain many conservatisms in the parameters and analytical models. The best estimate analysis presented show the large effect these conservatisms have on the design of the containment. Furthermore, the probability analysis presented in this report shows that the probability of the parameters and models being the conservative ones used in the design analysis is extremely small. Also this analysis shows that the probability of exceeding containment design pressure is even smaller. The results of this paper show that a considerable reduction in containment volume could be made while still retaining a large margin for safety. (Atomindex citation 10:463636)

JAERI-M-8009 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Annual Report on Neutron Scattering Studies in JAERI, July 1, 1977-August 31, 1978.
Y. Hamaguchi, M. Iizumi, and Y. Endoh. Dec 78, 129p
U.S. Sales Only.

Neutron scattering studies carried out by Division of Physics, JAERI, and several universities with neutron beam facilities at JRR-2 and 3 in Tokai are described for the period from July, 1977 to August, 1978. Contents are 51 individual reports and list of publications during the period. (Atomindex citation 10:488986)

JINR-R-3-11593 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Energy Spectrum Measurements for Upscattered Ultracold Neutrons.
A. D. Stoica, and A. V. Strelkov. 1978, 10p
In Russian.
U.S. Sales Only.

An energy spectrum of upscattered ultracold neutrons during their containment in copper vessels was measured using a 4-detector system with variable effective thickness. Due to extremely low density of the heated neutron flux from the vessel surface (5x10 exp -4 neutr/cm exp 2 xs) their mean energy was estimated as approx. 10 MeV. Possibilities of the proposed methods for spectrometry of neutrons in specific experimental setups are considered. (Atomindex citation 10:428625)

LA-8193-MS PC **A06**/MF **A01**
Los Alamos Scientific Lab., NM.
Computational Benchmark Problem for Deep Penetration in Iron.
J. S. Hendricks, and L. L. Carter. Jan 80, 104p
Contract W-7405-ENG-36

A calculational benchmark problem which is simple to model and easy to interpret is described. The benchmark consists of monoenergetic 2-, 4-, or 40-MeV neutrons normally incident upon a 3-m-thick pure iron slab. Currents, fluxes, and radiation doses are tabulated throughout the slab. (ERA citation 05:017137)

MLM-2242(Rev.1) PC **A06**/MF **A01**
Mound Facility, Miamisburg, OH.
Safety Analysis Report for Packaging (SARP) For USA/5790/BLF (DOE-AL) and USA/5791/BLF (DOE-AL).
L. G. Roome, R. A. Watkins, R. E. Bertram, and H. B. Kreider. 25 Jan 80, 109p
Contract EY-76-C-04-0053

This revised Safety Analysis Report for Packaging (SARP) includes discussions of structural integrity, thermal resistance, radiation shielding and radiological safety, nuclear criticality safety, and quality control of shipping containers. Much of the information was previously submitted to AEC/OSD/ALO and the Department of Transportation (DOT) and provided the basis for obtaining special permits DOT-SP-5790 and DOT-SP-5791 as well as the Interim Certificates of Compliance until the original SARP could be prepared and Certificates of Compliance issued by ERDA. This SARP revision incorporates information on certain design changes, the most significant of which relate to the inner container for the type 5790 package. Complete physical and technical descriptions of the packages are presented. Each package consists of a cylindrical steel inner container centered within an insulating steel drum assembly. The contents may be any radioactive materials which satisfy the requirements established in this SARP. A shipment of plutonium-238 in the form of a solid oxide is evaluated in this SARP as an example. The results of the nuclear criticality safety analysis show how much of the fissile isotopes may be shipped as Fissile Class I, II, or III for each container. Design and development considerations, the tests and evaluations required to prove the ability of the containers to withstand normal transportation conditions, and the sequence of four hypothetical accident conditions (free drop, puncture, thermal, and water immersion) are discussed. Tables, graphs, dimensional sketches, photographs, technical references, loading and shipping procedures, Mound Facility experience in using the containers, and copies of the DOE Certificates of Compliance are included. Internal reviews of the original and revised SARP's have been performed in compliance with the requirement of DOEM 5201-Part V. (ERA citation 05:014021)

ND-R-259(R) PC **02**//MF **A01**
UKAEA Risley Nuclear Power Development Establishment (England).
Safe Transport of Radioactive Materials.
W. deL. M. Messenger. Feb 79, 17p
U.S. Sales Only.

The hazards of radioactive materials in transport are surveyed. The system whereby they are safely transported between nuclear establishments in the United Kingdom and overseas is outlined. Several popular misconceptions are dealt with. (Atomindex citation 10:476932)

NIIAR-P-17(351) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Acceleration of the Convergence of the Iteration Process by Chebyshev Polynomials While Solving the Neutron Transport Equation Using the Galerkin Method.
S. A. Bikineeva, M. N. Zizin, and O. P. Chukhlova. 1978, 20p
In Russian.
U.S. Sales Only.

Described are the two- and three-layer methods for acceleration of the convergence by Chebyshev polynomials as well as the modification of the three-layer iteration method. The methods for acceleration of the convergence process are considered as applied to the neutron transport equations which can be solved using the Galerkin method in the diffusion approximation for two-dimensional geometry, this being the distinctive feature of the paper. Presented are the results from the calculations carried out on some reactor models using both the convergence acceleration and the simple iteration methods. It is shown that the two- and three-layer methods give practically the same results. (Atomindex citation 10:477101)

NUREG/CR-0958 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Analysis of Particulate Transmission Through Small Openings Resulting from Container Stresses.
Technical rept.,
P. C. Owzarski, J. Mishima, L. C. Schwendiman, and C. M. Devary. Apr 80, 100p PNL-3067

This report concludes a study relating particle transmission to gas leakage through microopenings in containers subjected to stress. A methodology is presented for predicting plutonium oxide loss from shipping containers and is supported by theoretical models. A computer code calculates the behavior of a leaking container. New relationships between helium leak-test data and potential air leaks are presented for both capillaries and orifices.

NUREG/CR-1434 PC **A03**/MF **A01**
South Carolina State Dept. of Health and Environmental Control, Columbia. Bureau of Radiological Health.
Transportation of Low-Level Radioactive Waste into South Carolina.
Data collection Oct 78-Sep 79.
Apr 80, 45p
Contract NRC-06-78-357
Sponsored in part by Department of Transportation, Washington, DC.

Shipments of low-level radioactive waste into the Chem-Nuclear Systems, Inc. site near Barnwell, S.C., were surveyed to determine the origin of such wastes, types and condition of packages or containers, and compliance with existing regulations. Type A shipping casks were given special attention during the survey. Area monitors (TLD) were used around transportation terminals.

ORNL-5595 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Health and Safety Research Division Progress Report, May 1, 1978-September 30, 1979.
S. V. Kaye. Jan 80, 159p
Contract W-7405-ENG-26

Research activities of the Health and Safety Research Division for the period May 1978 through September 1979 are discussed. Abstracts of five individual items were prepared for the data base. (ERA citation 05:017134)

PNL-SA-6519 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Placing the Special Trains Issue in Perspective.
R. E. Rhoads, M. Chais, J. G. DeSteese, and W. V. Loscutoff. May 78, 7p
Contract EY-76-C-06-1830

The contention of the Association of American Railroads (AAR) that special trains are necessary for handling spent fuel is discussed. These special trains would not move faster than 35 mph nor carry any nonradioactive freight. When a special train meets, passes, or is passed by another train, one train would stand still while the other moves past at a speed of less than 35 mph. The shippers feel these special trains are not necessary and that they would increase the cost of transporting spent fuel possible alternatives to the current standoff between railroads and shippers of radioactive material are mentioned. (ERA citation 05:013143)

SAND-79-1402 PC **A06**/MF **A01**
Sandia Labs., Albuquerque, NM.
Program Strategy Document for the Nuclear Materials Transportation Technology Center.
R. M. Jefferson. Jul 79, 122p
Contract EY-76-C-04-0789

A multiyear program plan is presented which describes the program of the Nuclear Materials Transportation Technology Center (TTC) at Sandia Laboratories. The work element plans, along with their corresponding work breakdown structures, are presented for TTC activities in the areas of Technology and Information Center, Systems Development, Technology, and Institutional Issues for the years from 1979 to 1985. (ERA citation 05:014930)

STUDSVIK/K5-79/25 PC **A02**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).

Suggestions of Radiation Protection Instruments in Ships Used for Transporting Spent Fuel Elements from Nuclear Power Plants to Central Stores and Further to Fuel Reprocessing Plants.
G. Warenmo. Mar 79, 1p
In Swedish.
U.S. Sales Only.

Some radiation protection measures are necessary in ships which will be used for transporting spent fuel elements from nuclear power plants to central stores and further to fuel reprocessing plants in order to protect the crew from unnecessarily high radiation doses and to ensure that not allowable values occur. Such measures are discussed in this report as well as suitable radiation protection instruments for such ships. (Atomindex citation 10:492245)

UCRL-52871 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
500-MeV Electron Beam Bench-Mark Experiments and Calculations.
E. Farley, K. Crase, and D. Selway. Dec 79, 62p
Contract W-7405-ENG-48

Experiments measuring the energy deposited by electron beams were performed to provide bench marks against which to evaluate our HANDYL76 electron beam computer code. The experiments, done at Stanford's Mk III accelerator, measured dose vs depth and dose vs radius profiles induced in layered aluminum targets by 500-MeV electrons. The dose was measured by passive thermoluminescence and photographic film placed between aluminum plates. The calculations predict a dose vs radius profile that forward-peaks on axis after the beam passes through a 200-cm air gap; the experimental measurements do not show this peak. This discrepancy indicates there may be a problem in using HANDYL76 to calculate deep penetration of a target with a large gap. (ERA citation 05:017136)

18G. Radioactive Wastes and Fission Products

AED-Conf-77-470-001 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Concept of the German Electric Power Industry for the Management of Waste from Nuclear Power Plants.
C. Salander. 1977, 17p CONF-7710151-1
In German.Conference on the problems of radioactive wastes in nuclear technology, Essen, F.R. Germany, 20 Oct 1977.
U.S. Sales Only.

In the course of the last few years the project of a large reprocessing plant in the Federal Republic, originally in the hands of the nuclear industry, has been taken over by the public utilities. In 1977, the 'Projektgesellschaft Wiederaufarbeitung von Kernbrennstoffen' (PWK), founded in 1975 for this purpose, became the 'Deutsche Gesellschaft fuer die Wiederaufarbeitung von Kernbrennstoffen mbH' (DWK), the purpose of which is the planning, erection, acquisition, and operation of plants and services of all kinds for the management of waste from nuclear power plants, especially the storage and processing of spent fuel elements. This does not apply to plants for the final storage of radioactive waste, which come under the authority of the Federal government. Tasks and structure of this society are described. In the concept of the fuel cycle center, which is explained here in some detail, all process steps necessary for the treatment of spent fuel elements after their transport from nuclear power plants, i.e. acceptance and storage of the spent fuel elements, plutonium recycling and reuse of recoverable uranium, waste treatment and ultimate storage are carried out on a single site. In addition, the schedule for this long-term project is illustrated by a few examples, and cost and financing are briefly mentioned along with interim solutions for fuel element storage and the necessary public information work. (Atomindex citation 09:365112)

AGNS-35900-1.3-47 PC **A05**/MF **A01**
Allied-General Nuclear Services, Barnwell, SC.
Studies and Research Concerning BNFP. Spent Fuel Disassembly: Increasing Hot-Cell Storage Capacity at the Barnwell Nuclear Fuel Plant.
R. T. Anderson. Oct 79, 82p
Contract ET-78-C-09-1040

This report presents the results of work performed at AGNS in 1979 related to production-rate fuel disassembly in the existing hot cell spaces of the BNFP. The primary advantage of the developed technique is realized at a reprocessing plant facility where suitable hot cells and connecting storage pools are available. The existing spent fuel pools are also candidates for away-from-reactor (AFR) storage space. Storage estimates based on utilization of the BNFP indicate that a major expansion from 1600 MTU up to 3000 MTU is possible. The report presents data on the results of initial process development and prototype equipment testing. Assessments were made of operational safety, licensing, and economic factors. These studies indicate that the techniques are performable and have economic merit when there is a requirement for a large increment of new storage capacity. A development program plan is presented. This plan delineates the future work required to bring the process to a point where implementation is possible. (ERA citation 05:013136)

CONF-791112-52 PC **A02**/MF **A01**
Argonne National Lab., IL.
Measurement of Penetration Depths of Plutonium and Americium in Sediment from the Ocean Floor.
S. Fried, A. Friedman, J. Hines, R. Sjoblom, and G. Schmitz. 1979, 17p
Contract W-31-109-ENG-38
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

The clay-like sediment covering the ocean floor constitutes the last barrier that shields the biosphere from contamination by radionuclides stemming from the nuclear wastes of a subseabed repository. In the event of a failure of the engineered barriers the mobility of the released radionuclides in the sediment determines the rate and the extent of entry into the water of the ocean. The initial results of measurements designed to determine the mobility of transuranium elements in sediment from the ocean floor are presented. Data indicate very low migration rates and imply strong chemisorptive interaction with the sediment. (ERA citation 05:014956)

CONF-800117-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Nuclear Waste Management: A Perspective.
R. E. Leuze. 1980, 37p
Contract W-7405-ENG-26
American Nuclear Society conference, Tulsa, OK, USA, 15 Jan 1980.

The scope of our problems with nuclear waste management is outlined. Present and future inventories of nuclear wastes are assessed for risk. A discussion of what is presently being done to solve waste management problems and what might be done in the future are presented. (ERA citation 05:014932)

DP-MS-79-112 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Slurry Spray Distribution within a Simulated Laboratory Scale Spray Dryer.
P. C. Bertone. 20 Dec 79, 50p
Contract EY-76-C-09-0001
Thesis. Submitted to Univ. of Virginia, Charlottesville.

It was found that the distribution of liquid striking the sides of a simulated room temperature spray dryer was not significantly altered by the choice of nozles, nor by a variation in nozzle operating conditions. Instead, it was found to be a function of the spray dryer's configuration. A cocurrent flow of air down the drying cylinder, not possible with PNL's closed top, favorably altered the spray distribution by both decreasing the amount of liquid striking the interior of the cylinder from 72 to 26% of the feed supplied, and by shifting the zone of maximum impact from 1.0 to 1.7 feet from the nozzle. These findings led to the redesign of the laboratory scale spray dryer to be tested at the Savannah River Plant. The diameter of the drying chamber was increased from 5 to 8 inches, and a cocurrent flow of air was established with a closed recycle. Finally, this investigation suggested a drying scheme which offers all the advantages of spray drying without many of its limitations. (ERA citation 05:014940)

EUR-6213 PC **A03**/MF **A01**
Commission of the European Communities, Brussels (Belgium).
Testing and Evaluation of the Properties of Various Potential Materials for Immobilizing High Activity Waste. First Annual Report (1977).
G. Malow, V. Beran, W. Lutze, J. A. C. Marples, and J. T. Dalton. 1979, 38p
U.S. Sales Only.

Four borosilicate glasses and one Celsian glass ceramic were tested under strictly identical conditions. This report presents the results of the following test: (a) Leach testing of samples, in the as cast state, annealed at 800 exp 0 C for up to 100 days; (b) Grain titration test of hydrolytic resistance (DIN 12111); (c) Examination of the glass structure and its changes due to thermal effects, differential thermal analysis, x ray diffraction analysis, scanning electron microscopy, microprobe analysis. (Atomindex citation 10:492236)

HEDL-TC-1331 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Materials Interaction Test Summary Description.
J. C. Krogness. Jan 80, 14p
Contract EY-76-C-14-2170

The Materials Interaction Test is designed to provide early scoping data on host rock performance and interaction between nuclear waste canister materials and host repository media under conditions representative of expected disposal environments. Capsules containing these materials were put in a spent fuel assembly and subsequently placed in a disposal test to study behavior in a low-level radiation environment at temperatures expected to range between 300 and 400 exp 0 F. Thermal control capsules are being exposed in laboratory furnaces to allow a determination and separation of thermal and radiation effects. Post-test specimen examinations are planned to determine material property changes and interaction effects and provide data for understanding the effectiveness of host rock, canister, and cladding materials in long-term waste isolation. (ERA citation 05:013139)

HEDL-TC-1334(Rev.1) PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Spent Fuel Characterization Plan for Dry Surface Storage Demonstration Tests.
J. C. Krogness. Feb 80, 13p
Contract EY-76-C-14-2170

Pre- and post-test examinations are planned for spent fuel assemblies to be placed in Dry Surface Storage Demonstration (DSSD) tests at the Nevada Test Site (NTS). Selected spent fuel assemblies are being characterized to determine the condition of the assemblies and fuel rods prior to packaging for disposal. At the end of the two to five year DSSD program, the spent fuel assemblies will undergo a post-test characterization for analysis and comparison with pre-test examination data. Data obtained from these as well as from other demonstration tests and laboratory spent fuel tests will be used to develop a performance prediction model for spent fuel disposal. (ERA citation 05:014926)

INIS-mf-5298 PC **A10**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Vitrified Radwaste from Reprocessing. Material Concerning the Examination by the Swedish Nuclear Power Inspectorate of the Supplementary Geology Report from the KBS-Project.
1979, 210p
In Swedish.
U.S. Sales Only.

The Swedish Nuclear Power Inspectorate was designated by the Swedish Government to exam-

ne the supplementary geologic investigations performed by the utilities' KBS-project and to judge whether the area investigated, Sternoe in southern Sweden, could be used for constructing a safe repository for radioactive wastes or not. This report contains material that was ordered by or sent to the Nuclear Power Inspectorate as well as the report by the Inspectorate to the Government. (Atomindex citation 10:492264)

INIS-mf-5299 PC **A03**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Vitrified Radwaste from Reprocessing. Supplementary Geological Investigations of the KBS-Project, Sweden.
1979, 34p
In Swedish.
U.S. Sales Only.

The Swedish nuclear power utilities' application to load two new reactors, according to the so called Stipulation Act was denied by the Swedish Government i Novermber 1978. According to the Government the utilities' KBS-project had not demonstrated the existence of a large, light rockformation suited for disposal of the radioactive wastes or the spent fuels. In this report an account is given of the futher investigations that were undertaken by the KBS-project to prove that such a rockformation exists at Sternoe in Southern Sweden. (Atomindex citation 10:492265)

INIS-mf-5316 PC **A05**/MF **A01**
Technische Univ., Vienna (Austria).
Solidification of Liquids by the Use of Microwaves.
L. Rohrecker. Jun 79, 97p
In German. Thesis.
U.S. Sales Only.

A method of heating falling droplets of water by passing them through a microwave resonator excited at 14.5 GHz from a travelling wave tube amplifier is described. Optimum resonator shape is analysed and applications in inducing chemical reactions leading to the solidification of radiactive waste solutions are suggested. A computer program for determining dielectric heating of liquid drops is listed. (Atomindex citation 10:492240)

Juel-1593 PC **A05**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie.
Contribution to the Treatment of Low Level Radioactive Waste Solutions from the Fabrication or Refabrication of Nuclear Fuel Containing Ammonium Nitrate.
B. Mueller. May 79, 94p
In German. Thesis.
U.S. Sales Only.

During the fabrication of nuclear fuel a great quantity of low level radioactive waste is produced which can be neither released directly into the environment nor stored for a long period. This waste consists mainly of NH sub 4 NO sub 3 -solutions and can be destroyed by thermal decomposition in a suitable reactor. A process is described for the decomposition of these waste solutions in a spray tower. After the waste solution has been concentrated the heavy metals which are present in small amounts are filtered off to about 99.8%. The concentrate is then sprayed into a heated tower (300 exp 0 -600 exp 0 C) to decompose of the ammonium nitrate. The products which are generated in the decomposition tower are mainly N sub 2 , N sub 2 O, NO, NO sub 2 and H sub 2 O depending on the decomposition conditions. The condensate contains nitric acid. If ammonia or urea is added to the concentrate the pH of the concentrate increases to a value between 6 and 8 and the off-gas does not contain NO sub 2 any longer. The generation of NO can probably be avoided by slightly varying the flow sheet. The ammonium nitrate remaining amounts to less than 0.1%. In a bench scale apparatus, 6 kg of a waste solution containing 60% by weight ammonium nitrate were continuously decomposed per hour. Since the process equipment is relatively simple a scale-up to an industrial plant can easily be accomplished. (Atomindex citation 10:492238)

KFK-2780 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Heisse Chemie.
Quality of the alpha Spectra from Evaporated Sources and its Dependence Upon Temperature Effects and Absorption Properties.
W. Habicht, P. Dressler, and D. Ertel. Apr 79, 20p
In German.
U.S. Sales Only.

The quality of alpha spectra of Pu-238, Pu-239/40, Am-241, Cm-242 and Cm-244 from process solutions in fuel reprocessing plants obtained from evaporated sources depends decisively on such factors as alpha absorption, temperature and duration of tempering. A number of experiments were performed to find out optimum conditions for preparation; the results are discussed. (Atomindex citation 10:476211)

LA-UR-80-437 PC **A05**/MF **A01**
Los Alamos Scientific Lab., NM.
Laboratory Studies of Radionuclide Distributions Between Selected Groundwaters and Geologic Media.
B. R. Erdal. 1980, 91p
Contract W-7405-ENG-36

Extensive studies of the behavior of plutonium and americium in pH 8 groundwaters were made, particularly with respect to container sorption, filtering, and centrifugation. Significant improvements in the method used for measuring sorption ratios for these elements were developed, and their sorption-desorption ratios on argillite and tuff were measured. Effects of particle size, temperature, sampling location, mineralogy, and time were investigated for these elements. The chemical composition of the water was found to be a major factor that governs sorption behavior for some elements. Studies of the sorption of strontium, cesium, barium, cerium, europium, uranium, and americium on Hainesville salt dome materials were made under aerobic and anoxic (< 0.2 ppm oxygen) conditions using two synthetic groundwaters: one represented the Wilcox aquifer in the Hainesville region and the second was a dilute brine. Studies of the sorption of strontium, cesium, barium, cerium, europium, and uranium(VI) on granite and argillite were made under anoxic (< 0.2 ppm oxygen) conditions and the results were compared to earlier measurements made under aerobic conditions. The sorption of uranium(VI) on argillite under atmospheric conditions was investigated. Measurements of migration rates in crushed granite, argillite, and tuff were made and compared with batch results. Infiltration experiments involving the forced injection of activity into intact and fractured cores were also performed. Microautoradiographic techniques were used to detect specific sorption sites. This latter technique was also used to characterize the sorption of plutonium and neptunium on polished thin-sections of alluvium, granite, tuff, and argillite and to assess the amount of aggregation that occurred. Additional physical and chemical characterizations of the materials used in these studies were made, and new analytical techniques were developed. (ERA citation 05:014960)

LA-7931-PR PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Studies of Transuranic Waste Storage under Conditions Expected in the Waste Isolation Pilot Plant (WIPP). Interim Summary Report, October 1, 1977-June 15, 1979.
S. T. Kosiewicz, B. L. Barraclough, and A. Zerwekh. Jan 80, 33p
Contract W-7405-ENG-36

The major focus of the program has been on the gas generation potential of organic wastes produced by radiolytic and thermal degradation under simulated WIPP storage conditions. The effects of TRU contamination level, temperature, waste type, pressure, and exposure time on radiolysis are presented. In addition, results from preliminary experiments on processed sludge dewatering are discussed. A summary is presented here of the results of a detailed study of all retrievably stored TRU wastes present at LASL before January 1, 1978. The data indicate a gross volume for the LASL inventory of 1610 m exp 3 with a total weight of nearly 1.24 x 10 exp 6 kg (1240 metric tonnes). The dominant radionuclide contents of the waste are plutonium (primarily exp 238 Pu) and americium. (ERA citation 05:013159)

LBL-9582 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Laboratory Investigations on the Hydraulic and Thermomechanical Properties of Fractured Crystalline Rocks.
P. A. Witherspoon, D. J. Watkins, N. G. W. Cook, M. Hood, and J. E. Gale. Aug 79, 19p CONF-791033-3
Contract W-7405-ENG-48
Annual ONWI information meeting, Columbus, OH, USA, 30 Oct 1979.

The laws of fluid flow in fractures, the dependence of fracture conductivity on the size of the sample tested, and the thermomechanical properties of both intact and discontinuous samples in crystalline rocks were discussed. (ERA citation 05:014961)

LBL-9952 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Rock Instrumentation Problems Experienced During In-Situ Heater Tests.
E. Binnall, A. DuBois, and R. Lingle. Oct 79, 11p CONF-791112-51
Contract W-7405-ENG-48
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

A large amount of valid data has been obtained from the Stripa experiments by the use of modified and calibrated off-the-shelf rock instrumentation. The elevated temperatures and the need for long time integrity in a wet environment revealed unsolved problems. The identification and solution of these problems would greatly benefit future experiments. More effort should be applied to the development of instruments to meet the environmental, reliability and accuracy requirements for test site observations. (ERA citation 05:014962)

NUREG/CR-1167 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Evaluation of Isotope Migration-Land Burial; Water Chemistry at Commercially Operated Low-Level Radioactive Waste Disposal Sites.
Progress rept. no. 11, Oct-Dec 78,
P. Colombo, and A. J. Weiss. May 80, 63p BNL-NUREG-51113
Contract DE-AC02-76CH00016
See also NUREG/CR-1325.

Water samples were collected by anoxic procedures from trenches and from a well at the Maxey Flats, Kentucky, low-level radioactive waste disposal site. In-situ measurements of pH, Eh, specific conductance, dissolved oxygen, and temperature were made. The results of inorganic, organic, and radiochemical analyses are reported. Acid-base titration curves of the trench waters exhibit the complex nature of these waters compared to well water.

NUREG/CR-1168 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Properties of Radioactive Wastes and Waste Containers.
Progress rept. no. 13, Apr-Jun 79,
P. Colombo, and R. M. Neilson, Jr. May 80, 21p BNL-NUREG-51114
Contract DOE-EY-76-C-02-0016
See also NUREG/CR-1126.

A process control parameter envelope within which reasonable assurance can be given that satisfactory solidification will occur is the objective of this research. Initial work has determined the range of waste/binder radios which can be employed for the solidification of sodium sulfate regenerative wastes (containing up to 50 wt % sodium sulfate) with portland type I, II, and III cements. An experiment was performed to determine the effect of gamma irradiation exposure dose rate on the leachability of urea-formaldehyde waste forms.

NUREG/CR-1251 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Properties of Radioactive Wastes and Waste Containers.
Progress rept. no. 14, Jul-Sep 79,
P. Colombo, and R. M. Neilson, Jr. May 80, 13p BNL-NUREG-51132

Contract DE-AC02-76CH00016

Work directed towards determination of process control parameter envelopes within which reasonable assurance can be given that a satisfactory solidification occurs has continued. The purpose of these efforts and their ultimate utility are described. Waste/binder weight ratios within which portland type I, II, and III cements can be satisfactorily employed for the solidification of diatomaceous earth filter sludges containing up to 25 weight percent solids were determined.

NUREG-0673 PC **A02**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Answers to Questions About Removing Krypton from the Three Mile Island, Unit 2 Reactor Building.
Public information rept.
May 80, 24p

This document presents answers to frequently asked questions about the probable effects of controlled releases of the krypton presently contained within the reactor building of Three Mile Island, Unit 2. Also answered are questions about alternative means for removing the krypton.

NVO-210 PC **A11**/MF **A01**
Department of Energy, Las Vegas, NV. Nevada Operations Office.
Safety Assessment Document for the Spent Reactor Fuel Geologic Storage Test in the Climax Granite Stock at the Nevada Test Site.
Jan 80, 250p

The objective of the Spent Fuel Geologic Storage Test in the Climax Granite Stock is to evaluate the response of a granitic rock mass to the underground storage of encapsulated spent reactor fuel in a geometry that simulates a module of a large-scale geologic repository. This document reports an assessment of the safety of conducting this test. Descriptions are provided of the geography, meteorology, hydrology, geology, and seismology of the Climax Site; the effects of postulated natural phenomena and other activities at the nevada Test Site on the safety of the test; and the design and operation of the test facility and associated equipment. Evaluations are made of both the radiological and nonradiological impacts of normal operations, abnormal operations, and postulated accidents. It is concluded that conduct of the spent fuel test at the Climax Site will not result in any undue risk to the public, property, environment, or site employees. (ERA citation 05:013142)

N80-22062/7 PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
Analysis of Nuclear Waste Disposal in Space, Phase 3. Volume 1: Executive Summary of Technical Report.
Final Report.
E. E. Rice, N. E. Miller, K. R. Yates, W. E. Martin, and A. L. Friedlander. 31 Mar 80, 72p NASA-CR-161418
Contract NAS8-32391
2.

The objectives, approach, assumptions, and limitations of a study of nuclear waste disposal in space are discussed with emphasis on the following: (1) payload characterization; (2) safety assessment; (3) health effects assessment; (4) long-term risk assessment; and (5) program planning support to NASA and DOE. Conclusions are presented for each task.

N80-22063/5 PC **A17**/MF **A01**
Battelle Columbus Labs., OH.
Analysis of Nuclear Waste Disposal in Space, Phase 3. Volume 2: Technical Report.
Final Report.
E. E. Rice, N. E. Miller, K. R. Yates, W. E. Martin, and A. L. Friedlander. 31 Mar 80, 376p NASA-CR-161419
Contract NAS8-32391
2.

The options, reference definitions and/or requirements currently envisioned for the total nuclear waste disposal in space mission are summarized. The waste form evaluation and selection process is documented along with the physical characteristics of the iron nickel-base cermet matrix chosen for disposal of commercial and defense wastes. Safety aspects of radioisotope thermal generators, the general purpose heat source, and the Lewis Research Center concept for space disposal are assessed as well as the on-pad catastrophic accident environments for the uprated space shuttle and the heavy lift launch vehicle. The radionuclides that contribute most to long-term risk of terrestrial disposal were determined and the effects of resuspension of fallout particles from an accidental release of waste material were studied. Health effects are considered. Payload breakup and rescue technology are discussed as well as expected requirements for licensing, supporting research and technology, and safety testing.

ORNL/TM-6445 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Separation of Americium, Curium, and Rare Earths from High-Level Wastes by Oxalate Precipitation: Experiments with Synthetic Waste Solutions.
C. W. Forsberg. Jan 80, 103p
Contract W-7405-ENG-26

The separation of trivalent actinides and rare earths from other fission products in high-level nuclear wastes by oxalate precipitation followed by ion exchange (OPIX) was experimentally investigated using synthetic wastes and a small-scale, continuous-flow oxalic acid precipitation and solid-liquid separation system. Trivalent actinide and rare earth oxalates are relatively insoluble in 0.5 to 1.0 M HNO sub 3 whereas other fission product oxalates are not. The continuous-flow system consisted of one or two stirred-tank reactors in series for crystal growth. Oxalic acid and waste solutions were mixed in the first tank, with the product solid-liquid slurry leaving the second tank. Solid-liquid separation was tested by filters and by a gravity settler. The experiments determined the fraction of rare earths precipitated and separated from synthetic waste streams as a function of number of reactors, system temperature, oxalic acid concentration, liquid residence time in the process, power input to the stirred-tank reactors, and method of solid-liquid separation. The crystalline precipitate was characterized with respect to form, size, and chemical composition. These experiments are only the first step in converting a proposed chemical flowsheet into a process flowsheet suitable for large-scale remote operations at high activity levels. (ERA citation 05:014945)

ORNL-5562 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Volatility of Ruthenium-106, Technetium-99, and Iodine-129, and the Evolution of Nitrogen Oxide Compounds During the Calcination of High-Level, Radioactive Nitric Acid Waste.
S. J. Rimshaw, F. N. Case, and J. A. Tompkins.
Feb 80, 58p
Contract W-7405-ENG-26

The nitrate anion is the predominant constituent in all high-level nuclear wastes. Formic acid reacts with the nitrate anion to yield noncondensable, inert gases (N sub 2 or N sub 2 O), which can be scrubbed free of exp 106 Ru, exp 129 I, and exp 99 Tc radioactivities prior to elimination from the plant by passing through HEPA filters. Treatment of a high-level authentic radioactive waste with two moles of formic acid per mole of nitrate anion leads to a low RuO sub 4 volatility of about 0.1%, which can be reduced to an even lower level of 0.007% on adding a 15% excess of formic acid. Without pretreatment of the nitrate waste with formic acid, a high RuO sub 4 volatility of approx. 35% is observed on calcining a 4.0 N HNO sub 3 solution in quartz equipment at 350 exp 0 C. The RuO sub 4 volatility falls to approx. 1.0% on decreasing the initial HNO sub 3 concentration to 1.0 N or lower. It is postulated that thermal denitration of a highly nitrated ruthenium complex leads to the formation of volatile RuO sub 4 , while decarboxylation of a ruthenium-formate complex leads to the formation of nonvolatile RuO sub 2 . Wet scrubbing with water is used to remove RuO sub 4 from the off-gas stream. In all glass equipment, small amounts of particulate RuO sub 2 are formed in the gas phase by decomposition of RuO sub 4 . The exp 99 Tc volatility was found to vary from 0.2 to 1.4% on calcining HNO sub 3 and HCOOH (formic acid) solutions over the temperature range of 250 to 600 exp 0 C. These unexpectedly low volatilities of exp 99 Tc are correlated to the high thermal stability limits of various metal pertechnetates and technetates. Iodine volatilities were high, varying from a low of 30% at 350 exp 0 C to a high of 97% at 650 exp 0 C. It is concluded that with a proper selection of pretreatment and operating conditions the exp 106 Ru and exp 99 Tc activities can be retained in the calcined solid with recycle of the wet scrubbing solution. (ERA citation 05:014943)

ORNL-5578 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Effects of Gaseous Radioactive Nuclides on the Design and Operation of Repositories for Spent LWR Fuel in Rock Salt.
G. H. Jenks. Dec 79, 114p
Contract W-7405-ENG-26

Information relating to the identities and amounts of gaseous radionuclides present in spent LWR fuel and to their release from canistered spent fuel under plausible storage and disposal conditions was assembled, reviewed, and analyzed. Information was also reviewed and analyzed on several other subjects that relate to the integrity of the carbon steel canister in which the spent fuel is to be encapsulated and to the expected rates of transfer of gaseous radionuclides through crushed salt backfill within a disposal room in a reference repository in rock salt. The advantages and disadvantages were considered for several different canister-backfill materials, and recommendations were made regarding preferred materials. Other recommendations relate to encapsulation procedures and specifications and to needs for additional experimental studies. The objective of this work was to provide reference information, conclusions, and recommendations that could be used to establish design and operating conditions and procedures for a bedded salt repository for spent LWR fuel and that could also be used to help evaluate the safety of the repository. The results of this work will also generally apply to spent fuel repositories in domal salt. However, because the domal salt may have little or no brine inclusions within it, there may be little or no possibility that brine will migrate into open spaces around an emplaced canister. Addordingly, some of the concerns that result from the possible occurrence of brine migration in bedded salt may be of no importance in domal salt. (ERA citation 05:013163)

PNL-SA-7184 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Methodology for Assessing the Long-Term Safety of Radioactive Waste Storage in Geologic Formations.
A. Brandstetter. Sep 78, 4p CONF-7809198-1
Contract EY-76-C-06-1830
Meeting on migration of radionuclides in crystalline rocks, Studsvik, Sweden, 11 Sep 1978.

The development of the safety assessment methodology currently consists of four major tasks: release scenario analysis, waste release studies, release consequence analysis, and radionuclide sorption studies. Each of these tasks and plans for each are discussed. International cooperation on these tasks is urged. (ERA citation 05:013165)

PNL-SA-7197 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Workshop on Potentially Disruptive Phenomena for Nuclear Waste Repositories, July 27-28, 1977.
J. J. Jacobson. 1977, 37p
Contract EY-76-C-06-1830

The workshop on Potentially Disruptive Phenomena for Nuclear Waste Repositories brought together experts in the geosciences to identify and evaluate potentially disruptive events and processes and to contribute ideas on how to extrapolate data from the past into the next one million years. The analysis is to be used to model a repository in geologic media for long-term safety assessments of nuclear waste storage. The workshop included invited presentations on the following items: an overview of the Waste Isolation Safety Assessment Program (WISAP), simulation techniques, subjective probabilities and methodology of obtaining data, similar modeling efforts at Lawrence Livermore and Sandia Laboratories, and geologic processes or events. (ERA citation 05:013166)

PNL-2286(App.) PC **A11**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Descriptions of Reference LWR Facilities for Analysis of Nuclear Fuel Cycles. Appendixes.
K. J. Schneider, and T. J. Kabele. Sep 79, 232p
Contract EY-76-C-06-1830

The appendixes present the calculations that were used to derive the release factors discussed for each fuel cycle facility in Volume I. Appendix A presents release factor calculations for a surface mine, underground mine, milling facility, conversion facility, diffusion enrichment facility, fuel fabrication facility, PWR, BWR, and reprocessing facility. Appendix B contains additional release factors calculated for a BWR, PWR, and a reprocessing facility. Appendix C presents release factors for a UO sub 2 fuel fabrication facility. (ERA citation 05:013595)

PNL-2985 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Cladding Hull Decontamination Process: Preliminary Development Studies.
B. Griggs, and G. H. Bryan. Dec 79, 63p
Contract EY-76-C-06-1830

An investigation of the chemical and radioactive properties of fuel hulls was conducted to assist in a decontamination process development effort. The removal of zirconium oxide layers from zirconium was accomplished by a treatment in 600 exp 0 C HF followed by a dilute aqueous reagent. Similar treatment in fused alkali-zirconium fluoride salt baths was examined. A remotely operated small batch facility was developed and process parameters determined. 16 figures, 9 tables. (ERA citation 05:013132)

PNL-3000-3 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Nuclear Waste Management. Quarterly Progress Report, July-September 1979.
A. M. Platt, and J. A. Powell. Nov 79, 92p
Contract EY-76-C-06-1830

Research is reported on: decontamination and densification of chop-leach cladding residues, monitoring of effluents from waste solidification, TRU waste mobilization, Kr solidification, exp 14 C and exp 129 I fixation, waste management system and safety studies, waste isolation safety assessment, logging systems for shallow land burial, unsaturated zone transport, mobile organic complexes of fission products, electropolishing for surface decontamination of metals, and decontamination and decommissioning of Hanford facilities. (ERA citation 05:014935)

PNL-3050-1 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Research and Development Activities: High-Level Waste Immobilization Program. Quarterly Progress Report, January-March 1979.
J. L. McElroy, J. E. Mendel, W. F. Bonner, and M. H. Henry. Nov 79, 50p
Contract EY-76-C-06-1830

Liquid waste, made from zirconium-clad UO sub 2 power reactor fuel with an average burnup of 25,000 MWd/MT, was converted to glass by the in-can melting process. An intrinsic-gamma melt-level detection system was tested during the NWVP demonstrations; results showed that if a sufficient number of collimators are used the system will track the melt surface with a precision of 1 in. during the filling of cans with waste glass. The two canisters filled in the NWVP are both 8 in. in diameter and contain borosilicate glass of very similar compositions. One canister contains 116 kg of glass that generated 0.38 kW of self-heat when produced; the other contains 145 kg of glass, and generates 1.01 kW. Spray calcination of simulated Savannah River Plant liquid waste at a rate of 400 L/h was demonstrated in the 36-in.-dia. calciner. Five waste forms are being compared: concrete-containing waste calcine, sintered waste glass, glass-ceramic, Synroc B (a crystalline assemblage of titanates), and borosilicate waste glass (composition 76-68). Results of initial tests indicate that the reaction rate of carbon with water, previously found to be very low, may be increased in a radiation field. (ERA citation 05:014946)

PNL-3078 PC **A05**/MF **A01**
Teknekron Research, Inc., Berkeley, CA.
Nuclear Waste Management Issues: A Multidisciplinary Evaluation Framework. TeKneKron B-52865-A-L.
M. Hoffman. Feb 80, 90p
Contract EY-76-C-06-1830

Initially, this paper characterizes the nuclear waste problem that requires analysis to establish the rationale for an interdisciplinary approach to resolve it. The problem characterization also explains why the specific concern with contaminated groundwater and intrusion through drilling has been selected for the focus of the panel meeting. The Nominal Group Technique (NGT), the group process format chosen for the experts' deliberations, is explained in some detail and its value in facilitating the desired dialogue is described. The dialogue is organized around the various issue areas that would be of concern to a program manager dealing with the potential problem of radioactivity escaping to the biosphere through human intrusion into contaminated groundwater. The participants are identified by professional discipline so that the dialogue can be presented in a realistic fashion. Both the content of the dialogue and its format are evaluated. Particular attention is given to their usefulness in generating a cross-section of subissues and factors that should be addressed when analyzing the waste disposal system's adequacy to prevent contaminated groundwater escaping to the biosphere. (ERA citation 05:014936)

PNL-3153 PC **A09**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Comparative Techniques for Nuclear Fuel Cycle Waste Management Systems.
P. J. Pelto, and J. W. Voss. Sep 79, 177p
Contract EY-76-C-06-1830

A safety assessment approach for the evaluation of predisposal waste management systems is described and applied to selected facilities in the light water reactor (LWR) once-through fuel cycle and a potential coprocessed UO sub 2 -PuO sub 2 fuel cycle. This approach includes a scoping analysis on pretreatment waste streams and a more detailed analysis on proposed waste management processes. The primary evaluation parameters used in this study include radiation exposures to the public from radionuclide releases from normal operations and potential accidents, occupational radiation exposure from normal operations, and capital and operating costs. On an overall basis, the waste management aspects of the two fuel cycles examined are quite similar. On an individual facility basis, the fuel coprocessing plant has the largest waste management impact. (ERA citation 05:013133)

PNL-3226 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Field Test Facility for Monitoring Water/Radionuclide Transport Through Partially Saturated Geologic Media: Design, Construction, and Preliminary Description.
S. J. Phillips, A. C. Campbell, M. D. Campbell, G. W. Gee, and H. H. Hoober. Nov 79, 52p
Contract EY-76-C-06-1830

Shallow land burial has been a common practice for disposing radioactive waste materials since the beginning of plutonium production operations. Accurate monitoring of radionuclide transport and factors causing transport within the burial sites is essential to minimizing risks associated with disposal. However, monitoring has not always been adequate. Consequently, the Department of Energy (DOE) has begun a program aimed at better assuring and evaluating containment of radioactive wastes at shallow land burial sites. This program includes a technological base for monitoring transport. As part of the DOE program, Pacific Northwest Laboratory (PNL) is developing geohydrologic monitoring systems to evaluate burial sites located in arid regions. For this project, a field test facility was designed and constructed to assess monitoring systems for near-surface disposal of radioactive waste and to provide information for evaluating site containment performance. The facility is an integrated network of monitoring devices and data collection instruments. This facility is used to measure water and radionuclide migration under field conditions typical of arid regions. Monitoring systems were developed to allow for measurement of both mass and energy balance. Work on the facility is ongoing. Continuing work includes emplacement of prototype monitoring instruments, data collection, and data synthesis. At least 2 years of field data are needed to fully evaluate monitoring information. (ERA citation 05:014975)

RFP-2972 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Electrodecontamination Using a Basic Electrolyte.
E. L. Childs. 1979, 17p CONF-791103-72
Contract EY-76-C-04-3533
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

A decontamination procedure for stainless steel is described that has the following advantages: rapid decontamination, one minute of time to reach non-retrievable level; easy to separate contamination by filtration; contamination is easy to recover in nitric acid; the electrolyte has an extended life - can be reused; and the waste generated from spent electrolyte is compatible with Rocky Flats waste processing. (ERA citation 05:013157)

RHO-CD-78-34-4Q PC **A11**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Radioactive Liquid Wastes Discharged to Ground in the 200 Areas During 1978.
J. D. Anderson, and B. E. Poremba. 26 Mar 79, 235p
Contract EY-77-C-06-1030
Portions of document are illegible.

This document is issued quarterly for the purpose of summarizing the radioactive liquid wastes that have been discharged to the ground in the 200 Areas. In addition to data for 1978, cumulative data since plant startup are presented. Also, in this document is a listing of decayed activity to the various plant sites. (ERA citation 05:014978)

RHO-CD-78-35-4Q PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Radioactivity in Gaseous Waste Discharged from the Separations Facilities During 1978.
J. D. Anderson, and B. E. Poremba. 30 Mar 79, 25p
Contract EY-77-C-06-1030

This document is issued quarterly for the purpose of summarizing the radioactive gaseous wastes that are discharged from the facilities of the Rockwell Hanford Operations. Data on alpha and beta emissions during 1978 are presented where relevant to the gaseous effluent. Emission data are not included on gaseous wastes produced within the 200 Areas by other Hanford contractors. (ERA citation 05:014979)

STUDSVIK/E2-79/38 PC **A02**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Preliminary Mini Experiments on Leaching of Glass. A Report of the Situation 1979-03-15.
G. Blomqvist. Apr 79, 13p
In Swedish.
U.S. Sales Only.

The work performed within a project concerning preliminary mini experiments on the leaching of glass up to 1979-03-15 is summarized. It is shown that steady states are not obtained during one month for the investigated elements (Na, Cs, Sr, Ba) while the concentration of Ca in the leachate decreases to almost zero. The solubility of glass seems to be dependent on the volume. (Atomindex citation 10:492252)

UCRL-15173 PC **A07**/MF **A01**
Brown Univ., Providence, RI. Dept. of Geological Sciences.
Precipitation and Lake-Level Changes in the West and Midwest over the past 10,000 to 24,000 Years. Final Report.
T. Webb, III, F. A. Street, and S. Howe. 4 Feb 80, 129p
Contract W-7405-ENG-48

The goal of the research described in this report is to document the climatic variability over the past

10,000 to 20,000 years in areas in which sites may be designated for the burial of nuclear wastes. Three separate data sets were studied, and the results are presented in three chapters. The first data set consisted of radiocarbon dates documenting past changes in lake levels in lakes and playas in the western United States. The sites were mapped where water levels were higher than the levels today and were presented in a table telling what evidence is available at each site. The lake-level fluctuations for the past 24,000 years at sites in the West were also mapped and time series for these fluctuations at four sites were presented. The second data set was a selection of the published radiocarbon-dated polien diagrams from the western United States. These data are a valuable source of climatic information and complement the geological evidence of lake-level fluctuations in the West. A table is presented that gives the location, elevation, and number of radiocarbon dates for each site. The third data set was a set of fossil pollen data from 20 sites in the upper Midwest. These data were calibrated in terms of precipitation changes over the past 10,000 years, and maps are presented of the estimated precipitation changes between 10,000 and 7000 years ago and between 7000 years ago and today. (ERA citation 05:014985)

UCRL-15177 PC **A05**/MF **A01**
Golder Associates, Inc., Golden, CO.
Review of Y/OWI/TM-36: Repository Design Performance in Salt, Granite, Shale or Basalt.
R. Talbot, and O. B. Nair. Sep 79, 76p
Contract W-7495-ENG-48

As part of the ongoing work by the Lawrence Livermore Laboratory to evaluate repository design performance, this memorandum presents a review of the preconceptual repository design described in Y/OWI/TM-36, Technical Support for GEIS: Radioactive Waste Isolation in Geologic Formations, April 1978. The purpose of this review is: to assess the adequacy of the design procedures and assumptions; to identify inappropriate or unsubstantiated design issues; to identify areas where additional numerical analyses may be required; and to develop data for inclusion in a reference repository design. The preconceptual repository design is presented in the form of 23 volumes of data base, analyses, and design layouts for four rock types: bedded salt, shale, granite and basalt. This memorandum reviews all four repository designs. (ERA citation 05:014987)

UCRL-15178 PC **A05**/MF **A01**
Golder Associates, Inc., Golden, CO.
General Basin Modeling for Site Suitability. Draft Report 1. Baseline Data.
Apr 79, 80p
Contract W-7405-ENG-48

This report summarizes work completed by Golder Associates under Task 2 - Site Suitability specifically for modeling of fluid flow and mass transport in sedimentary basins containing thick shale or salt. It also describes ongoing and future work on the above topic. The purpose of the study is to develop a general model for a nuclear waste repository situated in a deep sedimentary basin environment. The model will be used in conjunction with Golder's fluid flow and mass transport codes to study specific aspects of nuclide transport by groundwater flow. (ERA citation 05:014988)

UCRL-15179 PC **A03**/MF **A01**
Golder Associates, Inc., Grand Junction, CO.
Numerical Modeling of Solute Transport in Groundwater.
I. Miller. Dec 79, 41p
Contract W-7405-ENG-48

Although the Galerkin finite element method has been used for problems of solute transport by flowing groundwater for nearly a decade, there are a number of problems which make its use as a routine modeling technique somewhat difficult. This report discussed three problem areas: boundary conditions, interfaces between materials of different permeabilities or radically different velocity vectors, and numerical instability. Methods are proposed for improving these problem areas and are demonstrated using a sample problem. (ERA citation 05:014989)

UCRL-15181 PC **A08**/MF **A01**
Golder Associates, Inc., Golden, CO.
Regional Flow and Solute Transport Modeling for Site Suitability, Part I.
J. Rowe, and I. Miller. Dec 79, 172p
Contract W-7405-ENG-48

The nature of regional flow systems in large sedimentary basins will largely determine the effectiveness of regional flow as a barrier to radionuclide escape from deep geologic repositories. The purpose of the work reported herein and the proposed future work is to develop a methodology for evaluating regional flow barriers by using numerical models. The Williston Basin was chosen as an archetype case for the regional modeling study. However, due to the simplified nature of the study, the results are not meant to represent the behavior of a repository actually placed within the Williston Basin. The major components of this Phase I study are: (1) assembly and reduction of available data; (2) formulation of a simplified geohydrologic model; (3) computer simulation of fluid flow; and (4) computer simulation of solute transport. As of this report, the first two items are essentially completed. Computer simulation of fluid flow will require some revision and further study, which will be done in the second phase of this study. Computer simulation of solute transport has been considered only on a very preliminary basis. Important conclusions of this Phase I study are as follows. Assembly and reduction of data require an extensive work effort. Generally, the parameters describing fluid flow are poorly known on a regional basis and those describing solute transport are unknown. (ERA citation 05:014990)

VTT-REA-40 PC **A02**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Otaniemi (Finland). Reaktorilaboratorio.
Suitability of Using Concrete for Solidification of Liquid Radioactive Wastes.
Tommy Boeoek, and J. -P. Aittola. Dec 78, 23p
In Swedish.
U.S. Sales Only.

This critical review discusses the solidification of intermediate and low-level radioactive wastes. Feasibility studies of the incorporation of radioactive wastes from nuclear power plants into concrete has been done especially considering Finnish conditions. Many different types of cements and admixtures have been studied. The reported results in the literature have been somewhat conflicting and because of that the authors proposed research activities in analysing the properties of different types of cements. (Atomindex citation 10:463768)

18H. Radioactivity

AD-A083 070/3 PC **A03**/MF **A01**
Emmanuel Coll Boston MA
A Table of Parameters for Heavy Ion Tracks in CR-39 Nuclear Track Detector.
Rept. for 1 Apr-31 Dec 79,
E. Holeman, T. Spencer, Y. V. Rao, and M. P. Hagan. Jan 80, 41p SCIENTIFIC-1, AFGL-TR-80-0035
Contract F19628-79-C-0102

A number of parameters that are generally used for the analysis of the heavy ion tracks in CR-39 Nuclear Track Detector have been computed. The parameters are: Residual Range(R), Velocity (beta=V/c), Kinetic Energy per Nucleon (e/nucleon), Effective Charge (z sub eff) and Energy Loss of heavy ions (dE/dx). The computation has been performed for isotopes of interest in cosmic ray work, with charges in the region $2 < \text{or} = z < \text{or} = 30$ and for residual range, $R < \text{or} = 30$ cm. In any Nuclear Track Detector, the residual range of a stopping particle is a very easily measured quantity. The residual range is used as the first entry in the track parameter table. The corresponding velocity is given in the second column. The velocity provides a link with the rest of the parameters. All the entries in a row are interdependent and the table will give the value of these parameters if any one is known.

AD-A083 515/7 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Documentation and Analysis of the WSEG-10 Fallout Prediction Model.
Master's thesis,
Dan W. Hanifen. Mar 80, 114p Rept no. AFIT/GNE/PH/80M-2

The purpose of this independent study is to recreate and document the most popular analytical fallout model in use over the past twenty years, WSEG-10. Local access to WSEG-10 at the Air Force Institute of Technology, School of Engineering, will provide a basis for future fallout studies. As such, this study provides a fully documented Fortran computer code containing the most recent version of the WSEG-10 analytical model with sample output. To further understand this computer code, a general discussion of the WSEG-10 fallout model and analysis of crossrange dispersion (sigma (y)) and activity conservation is included. Results of the analysis of sigma(y) demonstrate that diffusive growth is not accounted for in the model and that crosswind shear is the dominant, long term effect. In a comparative conservation analysis, the WSEG model in use today does not conserve activity due to the unnormalized character of the crossrange transport function. This effect is substantial at yields less than .1 MT. Activity not conserved varied between 31.4% at 1 KT and a wind of 60 st. mi. Also included is a further discussion of model limitations or inconsistencies discovered either through computer use during this independent study or during initial literature search.

COO-2529-12 PC **A08**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Plutonium and Cesium Radionuclides in the Hudson River Estuary and Other Environments. Annual Technical Progress Report, December 1, 1978-November 30, 1979.
H. J. Simpson, and R. M. Trier. 1979, 171p
Contract EY-76-S-02-2529

Radionuclide activities were measured in a large number of sediment cores and suspended particle samples throughout the salinity range of the Hudson River estuary. Activities of exp 137 Cs, exp 134 Cs and exp 60 Co determined by gamma spectrometry and exp 239 exp 240 Pu and exp 238 Pu determined by alpha spectrometry indicate reasonably rapid accumulation rates in the sediments of marginal cove areas, and very rapid deposition in the harbor region adjacent to New York City. General distributions of exp 137 Cs and exp 239 exp 240 Pu are similar in surface sediments and with depth in cores, but there are deviations from the fallout ratio due to addition of reactor exp 137 Cs and loss of exp 137 Cs from the particle phases at higher salinities. Measurable amounts of reactor-derived exp 134 Cs and exp 60 Co are found in nearly all sediment samples containing appreciable exp 137 Cs between 15 km upstream of Indian Point and the downstream of our sampling about 70 km south of the reactor. Accumulations of exp 239 exp 240 Pu in New York harbor sediments are more than an order of magnitude greater than the fallout delivery rate, probably primarily due to the accumulation of fine particles containing fallout plutonium in the harbor which have been transported from upstream areas of the Hudson. Measurements of fallout exp 239 exp 240 Pu in a saline lake with a high carbonate ion concentration yielded water column activities about two orders of magnitude greater than has been found for fallout plutonium in other continental waters, indicating extensive mobility in some natural water environments. Experiments using lake water suggest that carbonate ion may indeed be a critical factor in regulatory plutonium solubility. (ERA citation 05:014241)

COO-4364-2 PC **A02**/MF **A01**
Niagara Univ., NY.
Environmental Consequences of Atmospheric Krypton-85. Final Report, January 1, 1977-September 30, 1979.
W. L. Boeck. 1979, 17p
Contract EE-77-S-02-4364

Krypton-85 is a radioactive inert gas produced during normal operations of the nuclear fuel cycle. The quantities of krypton-85, that will be produced in the next century, are sufficient, if released, to alter the electrical state of the atmosphere. The principal hypothesis is that an anthropogenic alter-

ation of the electric state of the atmosphere could alter other meterological phenomena and lead to significant environmental impacts. The goal of this project was to explore some areas of basic science related to the evaluation of that hypothesis. The approach was primarily theoretical. The following topics were addressed: a first approximation model to estimate the effects of krypton-85 on the electrical state of the atmosphere; an analysis of the pathways between krypton-85 production and the atmosphere; an analytical model for fair weather atmospheric electricity; and a dipole model for atmospheric electricity. The results will provide a framework on which detailed models can be built. The results should provide better understanding of some topics in atmospheric electricity. (ERA citation 05:014199)

DOE/EV-0005/18 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Formerly Utilized MED/AEC Sites Remedial Action Program: Radiological Survey of the Former Virginia-Carolina Chemical Corporation Uranium Recovery Pilot Plant, Nichols, Florida. Final Report.
F. F. Haywood, R. W. Doane, W. A. Goldsmith, W. H. Shinpaugh, and D. J. Crawford. Jan 80, 92p
Contract W-7405-ENG-26

The results of a radiological survey conducted at the site of a former uranium recovery pilot plant operated by the Virginia-Carolina Chemical Corporation is presented. All that remains of this operation is a concrete pad situated within the boundary of a phosphate products plant now operated by Conserv, Inc., at the Nichols, Florida site. The survey included measurements designed to characterize the residual radioactivity in the vicinity of this pilot plant and to compare the quantities with federal guidelines for the release of decontaminated property for unrestricted use. The results of this survey indicate that only small quantities of radioactivity exist above normal background levels for that area. Some soil contamination was found in the vicinity of a concrete pad on which the pilot plant stood. Much of this contamination was due to exp 226 Ra and exp 238 U. Some beta-gamma dose rates in excess of applicable guidelines were observed in this same area. External gamma-ray exposure rates at 1 m above the ground range from 20 to 100 mu R/hr. None of the direct measurements of alpha contamination were above guideline levels. (ERA citation 05:013178)

DOE/EV/70024-31 PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Oceanography.
Chemical and Geochemical Studies off the Coast of Washington. Progress Report, September 1978-August 1979.
R. Carpenter. Aug 79, 11p RLO-2225-T24-31
Contract EY-76-S-06-2225-024

Progress on a series of marine chemical and geochemical investigations involving both laboratory studies and field studies off the coast of Washington are summarized. Most of the field work has been on the Washington continental shelf, slope, and the submarine canyons indenting the shelf north of the Columbia River. The aim is to provide basic data required to characterize underlying chemical and physical processes and their rates which control the distributions, concentrations, and ultimate fate of some of the potentially hazardous agents associated with fossil fuel and nuclear power production or transportation. The studies have followed several main lines of investigation which are in various stages of completion: (1) field studies of the uptake and transport by zooplankton fecal pellets of exp 210 Po, exp 210 Pb, and other trace inorganic and organic constituents in a well-studied part of Puget Sound; (2) studies of the behavior of exp 210 Po and exp 210 Pb in sediments off the coast of Washington and the application of the exp 210 Pb determinations in sediment cores to determine sediment accumulation rates for the past 100 years, the depth of the surface mixed layer, and a mixing coefficient for the surface sediments; and (3) investigations of aliphatic and aromatic hydrocarbons in some of the same samples of organisms and sediment cores whose accumulation histories for the past 100 years we have determined with the exp 210 Pb technique. (ERA citation 05:012533)

INIS-mf-4124 PC **A06**/MF **A01**
Sao Paulo Univ., Sao Carlos (Brazil). Inst. de Fisica e Quimica.
System for Tritium Analysis in Natural Water.
A. A. Mozeto. 1977, 111p
In Portuguese.
U.S. Sales Only.

A method for the analysis, by scintillation counting, of tritium in natural water enriched electrolytically, is presented. The characteristics of the proposed system are indicated by experimental parameters, and by the performance obtained in the analysis of rain and underground waters. An evaluation of the precison and reproducibility of the measurements is also made. (Atomindex citation 09:365311)

JAERI-M-7721 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Alpha -Spectrum Analyzing Program ALPS.
H. Baba. Jun 78, 33p
In Japanese.
U.S. Sales Only.

A computer program was developed for analysis. The construction of the program is essentially the same as that of the gamma -spectrum analyzing program BOB73S, except for the peak-fitting part. The alpha line shape function was approximated with a Gaussian on the high-energy side smoothly connected to an exponential function for the loss tail on the low-energy side. Parameters describing the line shape function was determined separately for individual peak compounds in the spectrum. The program size is 114k words, and the speed of analysis is less than 10 sec by FACOM 230-75 for a spectrum with appropriate sharpness. Structure and functions of the program are described, and instructions are given on program usage. Reliability of the program was examined with alpha spectra obtained with plutonium isotopes and those constructed artificially with the single-peaked exp 210 Po spectrum. (Atomindex citation 10:438413)

LA-8189-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Oklo: Natural Fission Reactor Program. Progress Report, July 1-September 30, 1979.
A. E. Norris. Jan 80, 11p
Contract W-7405-ENG-36

Nearly 200 samples were collected at the Oklo mine in Gabon this quarter for shipment to the United States to continue studies of lead, ruthenium, and technetium migration around natural fission reactors. The first analyses of samples collected near a rich uranium ore body in Canada show the presence of radiogenic lead in pyrite and sandstone materials. Analyses of additional samples are underway to permit the interpretation of the data in terms of transport paths. A technique was developed this quarter to eliminate the interference of organic materials during the mass spectrometric analyses of ruthenium in Oklo samples with high asphaltic contents. A proposal was drafted for a study of naturally occurring radionuclide migration at rich uranium ore bodies in Australia to be performed jointly by the US Department of Energy and the Australian Atomic Energy Commission. (ERA citation 05:011288)

UUIP-979 PC **A03**/MF **A01**
Uppsala Univ. (Sweden). Inst. of Physics.
Determination of Pb-210 and Ra-226 in Lake Sediments and Dating Applications.
M. Farid, and A. F. El-Daoushy. Apr 78, 45p
U.S. Sales Only.

The natural radioactive isotopes Pb-210 and Ra-226 were measured in two sediment cores. The Pb-210 was determined by alpha -detection of its grand-daughter product Po-210, using the isotope dilution technique and a surface barrier detector. Some technical improvements in the polonium extraction were achieved. The radon emanation technique was used for the determination of Ra-226. The alpha -activity of Rn-222 was measured using an ionization chamber with an improved filling system, which allows both low level measurements and counter calibration with standard active samples. The memory effect due to adsorption of Rn-222 on the counter walls is studied. The accumulation rates are calculated from the unsupported Pb-210. The results from one core, Gillfjaerden, are in good agreement with some studies of the reservoir effect using C-14. The data from the other core, Lake Vaexjoesjoen, indicated an irregularity in the Pb-210 profile. Results from other studies on Lake Vaexjoesjoen showed a similar propensity. (Atomindex citation 09:408020)

18I. Reactor Engineering and Operation

AECL-6173 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Ottawa (Ontario).
Nuclear Power in Canada: Status and Prospects.
S. R. Hatcher. May 78, 30p
U.S. Sales Only.

The CANDU-PHW reactor is proven as a reliable and economic reactor for large-scale nuclear generating stations. Specialized Canadian manufacturing capability is well established for the design, manufacture, construction and operation of this pressure-tube reactor with its once-through fuel cycle. Retrievable storage of irradiated natural uranium fuel is safe, reliable and economic; a major research and development program is underway on the technology for immobilizing and disposing of either irradiated fuel or separated radioactive waste with emphasis on emplacement deep in stable geologic strata. The high neutron efficiency of CANDU keeps open options for more efficient fuel cycles, such as the thorium cycle; the existing CANDU concept could be used as a near breeder without the need for a major reactor development program. (Atomindex citation 09:411891)

AED-Conf-77-329-009 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Energy for a Righteous World with a Safe Future.
D. J. Rose. 1977, 13p CONF-7710166-5
In German.Problems of nuclear energy supply - chances, risks and perspectives in a changing energy economy, Bonn-Bad Godesberg, F.R. Germany, 3 Oct 1977.
U.S. Sales Only.

We are in charge of our energy future and thus of the future itself. Energy decisions in the past were made on a too narrow and short-term basis, and we can daily clearly observe their inadequacy. The policy's quality does not correspond to the significance of the problem. A greater approximation leads to a consequent policy of the development of energy alternatives, of which some considerably deviate from those which would result at a closer look. This lecture deals with two aspects of the problem, both concern the future of nuclear energy. The first aspect treats extensively the energy possibilities available to the world in the future; the second deals more with the problem of the acceptibility of nuclear energy, reprocessing of nuclear fuels, the relationship to atomic armament and the thus involved problems. (Atomindex citation 09:392621)

AEEW-R-1215 PC **A02**/MF **A01**
UKAEA Atomic Energy Establishment, Winfrith (England).
MABEL-1. A Code to Analyse Cladding Deformation in a Loss-of-Coolant Accident.
R. W. Bowring, and C. A. Cooper. Jun 78, 23p
U.S. Sales Only.

The MABEL-1 code has been written to investigate the deformation, of fuel pin cladding and its effects on fuel pin temperature transients during a loss-of-coolant accident. The code considers a single fuel pin with heated fuel concentric within the cladding. The fuel pin temperature distribution is evaluated using a one-dimensional conduction model with heat transfer to the coolant represented by an input set of heat transfer coefficients. The cladding deformation is calculated using the code CANSWEL, which assumes all strain to be elastic or creep and models the creep under a multi-axial stress system by a spring/dashpot combination undergoing alternate relaxation and elastic strain. (Atomindex citation 10:463628)

AEEW-R-1231 PC **A03**/MF **A01**
UKAEA Atomic Energy Establishment, Winfrith (England).

LOCA MK II. A Program for Calculating Fuel and Cladding Temperatures in SGHWR Following a Loss-of-Coolant Accident.
J. D. Matthews, and B. R. Gill. Jan 79, 40p
U.S. Sales Only.

A feature of the Steam Generating Heavy Water Moderated Reactor is the provision, of a spray cooling system on which major reliance is placed to limit fuel cladding temperatures during a loss-of-coolant accident. The LOCA MK II computer program which has been written to compute SGHWR fuel temperatures in a loss-of-coolant accident therefore models conditions in which blowdown cooling is only of marginal interest and where the major sources of heat removal are spray mechanisms and radiation. The report shows how a model of the SGHWR fuel cluster may be built up and the temperatures calculated. (Atomindex citation 10:463661)

ANL/ENG-80-02 PC **A03**/MF **A01**
Argonne National Lab., IL.
Study of Piping Configurations.
Y. Pan, A. Rafer, and H. Ahmed. Jan 80, 34p
Contract W-31-109-ENG-38

A study of piping and elbow flexibility is performed using an analytical approach and piping analysis computer programs ADLPIPE and MARC. The study focuses on pipe loop configurations commonly used to accommodate thermal expansion in such applications as Liquid Metal Fast Breeder Reactors. (ERA citation 05:013558)

CEA-CONF-4180 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Parallel Preprocessing in a Nuclear Data Acquisition System.
G. Pichot, E. Auriol, G. Lemarchand, and J. Millaud. 1977, 4p CONF-771023-54
Nuclear science symposium, San Francisco, CA, USA, 19 Oct 1977.
U.S. Sales Only.

The appearance of microprocessors and large memory chips has somewhat modified the spectrum of tools usable by the data acquisition system designer. This is particular true in the nuclear research field where the data flow has been continuously growing as a consequence of the increasing capabilities of new detectors. This paper deals with the insertion, between a data acquisition system and a computer, of a preprocessing structure based on microprocessors and large capacity high speed memories. The results shows a significant improvement on several aspects in the operation of the system with returns paying back the investments in 18 months. (Atomindex citation 10:433895)

CEA-CONF-4212 PC **A04**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Neutrons Rapides.
Breeder Reactors.
H. Gollion, and 1977, 52p CONF-7703127-1
In French.One-day information meeting on nuclear power plants, Grenoble, France, 9 Mar 1977.
U.S. Sales Only.

The reasons for the development of fast reactors are briefly reviewed (a propitious neutron balance oriented towards a maximum uranium burnup) and its special requirements (cooling, fissile material density and reprocessing) discussed. The three stages in the French program of fast reactor development are outlined with Rapsodie at Cadarache, Phenix at Marcoule, and Super Phenix at Creys-Malville. The more specific features of the program of research and development are emphasized: kinetics and the core, the fuel and the components. (Atomindex citation 10:463674)

CEA-CONF-4286 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services d'Electronique.
NEPTUNIX, A General Program of Simulation Applied to Nuclear Reactors.
A. Bonnemay, V. Dansac Bon, M. Nakhle, P. Roux, and Y. Monsef. 1978, 25p
In French.
U.S. Sales Only.

Most simulation languages admit an incremental description and involve explicit integration algorithms. NEPTUNIX is a simulation language directly admitting algebraic differential equations under an implicit form, and it involves a very efficient implicit integration method with variable step and order. NEPTUNIX is a tool used for building large systems models in the field of nuclear reactors. (Atomindex citation 10:463562)

CEA-CONF-4336 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services des Piles.
Determination of Material Irradiation Parameters. Required Accuracies and Available Methods.
J. M. Cerles, and P. Mas. 1978, 12p CONF-7805110-6
Working group on irradiation devices, Petten, Netherlands, 18 May 1978.
U.S. Sales Only.

In this paper, the author reports some main methods to determine the nuclear parameters of material irradiation in testing reactor (nuclear power, burn-up, fluxes, fluences, ...). The different methods (theoretical or experimental) are reviewed: neutronics measurements and calculations, gamma scanning, thermal balance, ... The required accuracies are reviewed: they are of 3-5% on flux, fluences, nuclear power, burn-up, conversion factor, ... These required accuracies are compared with the real accuracies available, which are at the present time of order of 5-20% on these parameters. (Atomindex citation 10:477092)

CEGB-RD/B/N-4052 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Fuel Temperature Coefficient of Reactivity Measurements at Hinkley Point 'B'.
A. R. R. Telford. Oct 78, 40p
U.S. Sales Only.

Reactivity ramp tests are described which have been carried out at Hinkley Point 'B' in order to determine the fuel temperature coefficient of reactivity of reactor 4 as a function of core burnup from 0 to 3000 MWD/Te. The type of test consisted of reactivity disturbances induced by withdrawing a bank of control rods for a few seconds, holding for a time to allow the feedback to develop then reinserting the rods to their original position. It is shown that these tests can be carried out quickly and with minimal disturbance to normal station operation. The experiments have been analysed (a) by direct simulation of the transients using KINAGRAX, in which the fuel temperature coefficient and control rod reactivity release rate were adjusted to obtain a good fit to the measured transient; (b) by analysis of the flux transient to give time dependent (using inverse kinetics analysis) and mean fuel temperature (using thermal hydraulics equations from KINAGRAX). The fuel temperature coefficient was then obtained from the variation of reactivity with fuel temperature at times when the control rods were stationary. (Atomindex citation 10:463652)

CEGB-RD/B/N-4231 PC **A04**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Radioactive Inventory of a Decommissioned Magnox Power Station Structure. 1. Measurements of Neutron Induced Activity in Samples from the Reactor Island.
P. B. Woollam. Sep 78, 51p
U.S. Sales Only.

This report is the first of a series which, together, aim to produce an accurate assessment of neutron induced activation levels in the fixed structural components of a reactor of the steel pressure vessel Magnox type. It describes the measurements made of induced activation, necessary in order to establish credibility in the complex calculations described in the subsequent reports. The report also attempts systematically to assess the potential contributions to the dose and disposal problem from all isotopes with a half-life in excess of 5 years. This is necessary in order to ensure that no isotope has been overlooked which could limit any part of the plan for the decommissioning of a Magnox reactor. In addition the report aims to determine concentrations, in each major material type, of trace elements which lead to the isotopes limiting in decommissioning. (Atomindex citation 10:463654)

CEGB-RD/B/N-4403 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Relation Between Fission Product Release and Fuel Microstructure in High Burn-Up UO sub 2.
J. A. Turnbull, and M. V. Speight. Oct 78, 22p
U.S. Sales Only.

The release of gaseous and volatile fission products from UO sub 2 irradiated at temperature below approximately 1500 exp 0 C is discussed in terms of simple diffusion models taking account of grain boundary bubble formation and the re-solution of atoms from them. It is shown that the release of stable gas is moderated by re-solution hence the rate of release from the fuel increases with burn-up by virtue of the increasing fraction of grain boundary porosity remaining permanently open to the free surface. Re-solution is unimportant for active species but their release rates are affected in other ways by the behaviour of grain edge bubbles, specifically the frequency with which bubbles vent to the free surface and their probability of remaining permanently open. The reliance of the rate of release of active species on the grain boundary microstructure ensures that the release fractions of both stable and active fission products are closely associated. (Atomindex citation 10:463604)

CEGB-RD/B/N-4415 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Method for Studying Activity Profiles in Surface Layers.
A. G. Warner. Oct 78, 9p
U.S. Sales Only.

A method is described for obtaining an activity profile for oxidized steel specimens in which the surface layers are eroded by sputtering with a beam of argon ions. The sputtered material is collected on metal plates for subsequent activity measurement. The method has been shown to produce sputtering rates of around 1 mu g mC exp -1 , corresponding to thinning rates of about 1 mu m h exp -1 . The sputtered material could be collected with 25 to 50% geometrical efficiency. The depth resolution was about 20 nm. (Atomindex citation 10:463747)

CONF-791103-69 PC **A02**/MF **A01**
Argonne National Lab., IL.
Alpha-Gamma Hot-Cell Facility at Argonne National Laboratory East.
L. A. Neimark, W. D. Jackson, and D. A. Donahue. 1979, 22p
Contract W-31-109-ENG-38
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

The Alpha-Gamma Hot-Cell Facility has been in operation at Argonne National Laboratory East (ANL-E) for 15 years. The facility was designed for plutonium research in support of ANL's LMFBR program. The facility consists of a kilocurie, nitrogen-atmosphere alpha-gamma hot cell and supporting laboratories. Modifications to the facility and its equipment have been made over the years as the workload and nature of the work changed. These modifications included inerting the entire hot cell, adding four work stations, modifying inloading procedures and examination equipment to handle longer test articles, and changing to a new sodium-vapor lighting system. Future upgrading includes the addition of a decontamination and repair facility, use of radio-controlled transfer carts, refurbishment of the zinc bromide windows, and the installation of an Auger microprobe. (ERA citation 05:014020)

CONF-791103-73 PC **A02**/MF **A01**
Argonne National Lab., IL.
Hot Cell Measuring and Test Equipment Calibration Control.
K. J. Taylor. 1979, 17p
Contract W-31-109-ENG-38
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

The need for increasingly accurate data on the performance of fuels and materials in nuclear reac-

tors has placed increased emphasis on the quality of measurement of data obtained in hot cells. A program has been proposed to incorporate the basic features of a standard measurement laboratory while recognizing the unique aspect of hot-cell measurements. That hot cells must comply with calibration procedures in order to maintain control of measurement parameters has been the basis for the system proposed for implementation in the Hot Fuel Examination Facility (HFEF) at the Argonne-West Site, Idaho Falls, Idaho. (ERA citation 05:016297)

CONF-800403-4 PC **A02/MF A01**
EG and G Idaho, Inc., Idaho Falls.
In-Pile Post-DNB Behavior of a Nine-Rod PWR-Type Fuel Bundle.
F. S. Gunnerson, and P. E. MacDonald. 1980, 8p
Contract EY-76-C-07-1570
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

The results of an in-pile power-cooling-mismatch (PCM) test designed to investigate the behavior of a nine-rod, PWR-type fuel bundle under intermittent and sustained periods of high temperature film boiling operation are presented. Primary emphasis is placed on the DNB and post-DNB events including rod-to-rod interactions, return to nucleate boiling (RNB), and fuel rod failure. A comparison of the DNB behavior of the individual bundle rods with single-rod data obtained from previous PCM tests is also made. (ERA citation 05:015805)

DLCS-5000379 PC **A03/MF A01**
Duquesne Light Co., Shippingport, PA.
(Shippingport Atomic Power Station). Quarterly Operating Report, Third Quarter 1979.
1979, 28p
Contract EY-76-C-11-0292

At the beginning of the third quarter of 1979, the Shippingport Atomic Power Station remained shutdown to complete repairs of the turbine generator hydrogen circulation fan following discovery of a rubbing noise on May 24, 1979. The Station was in a cooldown condition at approximately 180 exp 0 F and 300 psig with a steam bubble in the pressurizer and the reactor coolant pumps in slow speed. The reactor plant cooldown heat exchanger was in service to maintain coolant temperature. The 1A, 1B, 1C, and 1D reactor coolant loops and the 1AC and 1BD purification loops remained in service. All expended PWR Core 2 fuel elements have previously been shipped off-site. The remaining irradiated PWR Core 2 core barrel and miscellaneous refueling tools were in storage under shielding water in the deep pit of the Fuel Handling Building. The LWBR Core has generated 12,111.00 EFPH from startup through the end of the quarter. (ERA citation 05:015735)

GA-A-15712 PC **A02/MF A01**
General Atomic Co., San Diego, CA.
Production of Liquid Fuels with a High-Temperature Gas-Cooled Reactor.
R. N. Quade, D. L. Vrable, and L. Green, Jr. Dec 79, 14p CONF-791204-17
Contract AT03-76SF10610
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

Recent events by OPEC have sharply increased interest in the United States for synfuels, and there are plans for several types of synfuel demonstration plants. The early timing of these plants will probably preclude their use of a nuclear heat source, but their operation will be a necessary step to the eventual integration of a nuclear heat source. The applications using coal liquids that are considered active candidates for nuclear process heat, the reference heat source design, and nuclear and non-nuclear methods for coal liquefaction are described. (ERA citation 05:013584)

HEDL-SA-1839 PC **A02/MF A01**
Hanford Engineering Development Lab., Richland, WA.
Thermal Bowing of Wire-Wrapped Fuel Pins in Fast Reactors.
D. P. Chan, and R. J. Jackson. 1979, 24p CONF-791103-68
Contract EY-76-C-14-2170
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1979.

The mechanism of thermal bowing of fuel pins is discussed. Finite element models for thermal bowing analysis using MARC-CDC and BEAM-CREEP programs are presented. Analytical results are in reasonably close agreement with each other. Thermal bowings of edge fuel pins in various FTR core positions are predicted. Conservative predictions indicate that the reference edge pins with 30.48 cm (12 in.) axial pitch may touch the duct wall in as little as 1000 h or irradiation. The results further indicate that the axial stress induced in the cladding by thermal bowing is 4 times as much as that due to fission gas release. However, the combined axial stress level is still below that to cause stress rupture in the design life of the pin. (ERA citation 05:013559)

IAEA-R-1561-F PC **A02/MF A01**
International Atomic Energy Agency, Vienna (Austria).
Experimental Direct Digital Control of the Power Plant A1 Reactor Based on a Modern Control Theory Approach. Final Report for the Period 1 December 1974 - 31 July 1978.
C. Karpeta. Jan 79, 6p
U.S. Sales Only.

The objective of the project was to accumulate technical experience with application of modern control theory in nuclear power by carrying out a case study of an experimental direct digital control at the A1 reactor about its nominal steady state. The research has proved that slightly modified method of solution of the linear stochastic regulator problem can be successfully applied in design of digital control system of nuclear power reactors. (Atomindex citation 10:463608)

INEL-tr-44 PC **A02/MF A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente.
Preliminary Report: Thermometry of Fuel Rod Simulators in the REBEKA Experiment.
K. Wiehr. 1979, 25p
Contract W-7405-ENG-82
C IRB--308/79, July 1979.

The different attachment of thermocouples (TC) to the fuel rod simulators in the REBEKA experiments is described. A discussion follows concerning the possible measurement errors associated with the different TC attachments. Comparisons of temperature histories measured with embedded and spot-welded thermocouples show that in the experiments carried out to date the errors in cladding temperature determination up to rupture of the cladding can be caused by the external attachment of a thermocouple to the Zircaloy cladding, but that such errors are negligible. The difficulty of indicating the actual rupture temperature in a bundle experiment with two-phase cooling is described. Finally the effect of spot-welded thermocouples on wetting behavior is treated briefly. (ERA citation 05:015731)

INEL-tr-46 PC **A03/MF A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente.
Preliminary Report: Heat Transfer in a 5 X 5 Rod Bundle During the Refill and Reflood Phase of a Loss of Coolant Accident. First Bundle Test of 15 November 1977 in Conjunction with Nuclear Safety Project 4238, REBEKA.
K. Rust, K. Wiehr, and P. Ihle. 1979, 44p
Contract W-7405-ENG-82
C IRB--267/78, March 1979.

The significant temperature measurements for fuel rod cladding in the first REBEKA bundle are evaluated in relation to heat transfer and presented. The evaluation procedure, including the method for calculating heat transfer coefficients, is explained briefly. Thermohydraulic analysis and mathematical comparison with similar similators yields information about the thermohydraulic simulation quality. (ERA citation 05:015836)

INEL-tr-47 PC **A02/MF A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente.
Preliminary Report: REBEKA Thermocouple Test.
K. Wiehr, F. J. Erbacher, and H. J. Neitzel. 1979, 7p
Contract W-7405-ENG-82
C IRB--307/79, July 1979.

A REBEKA thermocouple test is suggested for clarification of the issue regarding the boundary conditions under which the Zircaloy cladding temperature is affected by the attachment of a spot-welded sheathed thermocouple. The test procedure and the parameters to be varied are explained. (ERA citation 05:015837)

INIS-mf-4158 PC **A03/MF A01**
Bhabha Atomic Research Centre, Bombay (India).
Inevitability of Atomic Energy in India's Power Programme.
R. Ramanna. 1977, 29p
U.S. Sales Only.

The case for atomic energy as the inevitable answer to the energy problem of India has been emphatically put up and supported with data. Hydroelectric power is costly to develop and moreover its potential is not enough to meet India's growing energy requirements. On the grounds of economics and safety, nuclear power has been shown to be superior to power from coal-based power plants. India's proved reserves of coal are 21 billion tonnes out of which 80% has ash content more than 20% and in order to reach only half of the present per capita energy consumption in Europe, the present output of 90 million tonnes/year of coal will have to be increased by a factor of 10, which in addition raises the problem of its transportation to the plant sites. Secondly, total energy from the available coal is estimated at 160 x 10 exp 12 kwh, while that from known reserves of 52,000 tonnes of uranium is 7.2 x 10 exp 12 kwh if used in thermal reactors and 208 x 10 exp 12 kwh if used in fast reactors. Thorium with its known reserves of 320,000 tonnes would give another 1280 x 10 exp 12 kwh. As for safety and ecology, it has been pointed out that : (1) in U.S., the number of coal miners dying of black cancer is 1000 per 10 exp 12 kwh of electricity generated, whereas the fatality rate of uranium miners due to lung cancer is 20 per 10 exp 12 kwh of electricity generated and (2) safety has been the primary concern in all aspects of nuclear technology - mining, fuel production, reactor operation and radioactive waste processing. A terrorist getting possession of plutonium for spreading it into atmosphere or making a nuclear bomb is highly improbable, because at any point throughout the fuel cycle plutonium is under strict security surveillance and it is impossible to make a nuclear device without the back-up of powerful laboratory facilities. Finally, India's three stage atomic power programme is described in brief. (Atomindex citation 09:376605)

INIS-mf-4261 PC **A02/MF A01**
Atomic Energy Control Board, Ottawa (Ontario).
Nuclear Safety Considerations with Emphasis on Instrumentation and Control Systems.
J. W. Beare. 1978, 17p CONF-7710184-1
IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

The conceptual model of a nuclear power plant in Canada is that it consists basically of two kinds of systems. The first kind is the process systems, that is, those structures and components associated with the production of nuclear energy and its conversion to other forms of energy. The second kind is the special safety systems, whose purpose it is to protect the public in the event of a serious failure in the process systems which might otherwise lead to unacceptable radiological consequences. Quantitative limits are set on the unavailability of the special safety systems. These limits are low enough to be consistent with low overall risk and yet can be demonstrated by test during operation of the plant. Low unavailability is an important but not the only condition required for low unreliability for the special safety systems. The special safety systems minimize the chance of a cross-linked failure particularly under the conditions experienced as a result of the more severe types of postulated serious process failures. Nuclear power plants

must also withstand, without a major hazard to the public, certain rare events associated with natural phenomena or man-made activities off-site and also certain in-plant events such as fire or break-up of a turbine-generator which might have a cross-linking effect on process and safety systems. In the latest designs, Canadian nuclear power plants have emergency systems to deal with such events. The emergency systems have an enhanced degree of physical and functional separation from other plant systems. (Atomindex citation 09:398906)

INIS-mf-4960 PC **A02**/MF **A01**
Argonne National Lab., IL.
Sodium Fire and Containment Leakage.
L. W. Person. 1978, 3p CONF-781022-108
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only.

A combination of statistical response surface method and existing sodium fire computer modelling will provide functional requirements to the reactor containment designer and give the range of radioactivity release to the environment via containment leakage for the radiation health physist. It can be generalized as a viable approach to reducing the time and cost required to obtain estimates of radiation safety aspects of nuclear power reactors. (Atomindex citation 10:463684)

INT-118/PR PC **A02**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Memory Organization Methods of Heuristic Reinforcement-Learning Systems with Potential Application for Nuclear Reactors Control.
M. Bubak, and J. Moscinski. 1977, 24p
In Polish.
U.S. Sales Only.

This paper investigates the application of heuristic learning system with linear reinforcement and different memory structures, to the problem of computer control of nuclear reactor. The learning algorithm with memory based on a sample set construction is elaborated by computer simulation technique. (Atomindex citation 10:463830)

KFK-2681 PC **A07**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Spaltstoffflusskontrolle.
Nuclear Safeguards Project. Annual Report 1977.
H. R. Mache. Oct 78, 139p
In German.
U.S. Sales Only.

The present report describes the major activities carried out in 1977 in the framework of the Nuclear Safeguards Project by the institutes of the Kernforschungszentrum Karlsruhe, Kernforschungsanlage Juelich, the European Institute of Transuranium Elements and some industrial firms. (orig.) 891 HP 892 AP. (Atomindex citation 10:434015)

LA-UR-79-2607 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Intelligent Data-Acquisition Instrumentation for Special Nuclear Material Assay Data Analysis.
C. D. Ethridge. 1980, 14p CONF-800306-2
Contract W-7405-ENG-36
International IECI conference, Philadelphia, PA, USA, 17 Mar 1980.

The Detection, Surveillance, Verification, and Recovery Group of the Los Alamos Scientific Laboratory Energy Division/Nuclear Safeguards Programs is now utilizing intelligent data-acquisition instrumentation for assay data analysis of special nuclear material. The data acquisition and analysis are enabled by the incorporation of a number-crunching microprocessor sequenced by a single component microcomputer. Microcomputer firmware establishes the capability for processing the computation of several selected functions and also the ability of instrumentation self-diagnostics. (ERA citation 05:013186)

LA-UR-79-2945 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Improved Gap Conductance Model for the TRAC Code.
S. W. Hatch, and D. A. Mandell. 1980, 14p
CONF-800403-5
Contract W-7405-ENG-36
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

The purpose of the present work, as indicated earlier, is to improve the present constant fuel clad spacing in TRAC-P1A without significantly increasing the computer costs. It is realized that the simple model proposed may not be accurate enough for some cases, but for the initial calculations made the DELTAR model improves the predictions over the constant delta r results of TRAC-P1A and the additional computing costs are negligible. (ERA citation 05:015815)

LA-UR-79-2946 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Evaluation of the Three Mile Island Accident in the Context of WASH-1400.
R. D. Burns, III. 1980, 6p CONF-800403-3
Contract W-7405-ENG-36
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

The accident at unit 2 of the Three Mile Island nuclear station (TMI-2) on March 28, 1979, occurred after approximately 400 reactor years (RY) of commercial nuclear reactor operation in the US. The purpose of work summarized here was to evaluate the probability statements in the WASH-1400 reactor safety study (RSS) in view of the TMI-2 event and to estimate the likely public impact of TMI-2. The RSS probability estimate for such a release was found to be consistent with the fact that the TMI-2 accident occurred. The expected health effects are consistent with those for a low-level category of radioactivity release as described in the RSS and they are immeasurably small. However, the public perception of the health effects of the release is likely to be much more severe than the estimated health effects. (ERA citation 05:015816)

LA-UR-79-2948 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Preliminary Review of Beyond DBA PWR Accident Sequences.
R. D. Burns, III, and J. H. Scott. 1980, 4p CONF-800403-6
Contract W-7405-ENG-36
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

Recent work to identify the most likely beyond design-basis-accident (DBA) sequences which could occur in US commercial pressurized water reactors (PWRs) is summarized. These are defined here as postulated sequences in which all events have been observed separately in US reactors. Further, they involve an initiating failure and one or two additional equipment failures or human errors. These sequences are deemed more likely than others in which all failure events have not been observed or which involve more failure events. The postulated accident sequences are taken from the larger set contained in the reactor safety study (WASH-1400). Reactor operating experience is from government reports summarizing licensee event reports. (ERA citation 05:015818)

LA-8160-PR PC **A07**/MF **A01**
Los Alamos Scientific Lab., NM.
Reactor Technology. Progress Report, July-September 1979.
M. Breslow, and S. Sullivan. Dec 79, 150p
Contract W-7405-ENG-36

Information is presented concerning the space reactor electric power supply; gas-cooled reactor safety; heat pipe technology development; and nuclear criticality experiments and safety. (ERA citation 05:013587)

NUREG/CR-0364 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
Simulating Barrier Penetration during Combat.
Technical rept.,
P. De Laquil, III. Apr 80, 37p SAND-78-8235
Contract NRC-60-78-096

A computer program, BARS, simulates combat between an adversary group attempting to hijack special nuclear material and escort personnel attempting to protect it. BARS is designed to investigate how various combat strategies and levels of performance affect the time required to penetrate barriers (armor, deterrent systems, etc.) against forcible entry. A Monte Carlo code, BARS uses a game theoretic approach to allocate the attacking and defending forces. Combat suppression is simulated using a stochastic state-transition model for the behavior of individuals under combat stress. The BARS program was developed as part of the overall combat modelling effort of the transportation safeguards program.

NUREG/CR-0972 PC **A07**/MF **A01**
Sandia Labs., Albuquerque, NM.
Light Water Reactor Safety Research Program Quarterly Report, January-March 1979. Volume 11,
Marshall Berman. May 80, 135p SAND-79-1542
See also NUREG/CR-0422.

This report presents studies and technical progress in the Light Water Reactor Safety Research Program for the January-March 1979 quarter. Topics covered are: (1) the molten core/concrete interactions study, (2) steam explosion phenomena, (3) statistical analysis, (4) UHI model development, and (5) two-phase jet loads.

NUREG/CR-0975 PC **A03**/MF **A01**
Mound Facility, Miamisburg, OH.
Nondestructive Assay Confirmatory Assessment Experiments: Mixed Oxide,
John F. Lemming. May 80, 47p MLM-2695
Contract DE-AC04-76-DP00053

The confirmatory assessment experiments demonstrate traceable NDA measurements of plutonium in mixed oxide powder using commercially available spontaneous-fission assay systems. The experiments illustrate two major concepts: the production of calibration materials using calorimetric assay, and the use of paired measurements for measurement assurance. Two batches of well-characterized mixed oxide power were used to establish the random and systematic error components. The major components of an NDA measurement assurance technique to establish and maintain traceability are identified and their functions are demonstrated.

NUREG/CR-1122 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Development of an Ultrasonic Imaging System to Measure the Size and Velocity of Large Bubbles Rising Through Liquids,
L. Adler, J. Lattimer, D. Fitting, and A. L. Wright. May 80, 47p ORNL/NUREG/TM-364
Contract W-7405-eng-26

A real-time ultrasonic imaging system was developed to permit the simultaneous measurement of the radii and velocities of large bubbles rising through a liquid. It was constructed as a possible technique for studying the dynamics of large bubbles rising in liquid sodium. The characterization of such bubbles in one part of a program at the Oak Ridge National Laboratory known as the Fuel Aerosol Simulant Test (FAST). The purpose of the FAST program is to investigate events following a simulated hypothetical core-disruptive accident in a liquid-metal fast breeder reactor.

NUREG/CR-1169-EX-SUM PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Safeguard Vulnerability Analysis Program (SVAP). Executive Summary,
F. M. Gilman, M. H. Dittmore, W. J. Orvis, and P. S. Wahler. Apr 80, 36p UCRL-52724
See also Volume 1, NUREG/CR-1169-V-1, and Volume 2, NUREG/CR-1169-V-2.

The steps involved in making a Safeguard Vulnerability Analysis Program (SVAP) application to a nuclear facility are summarized. NRC analysts are expected to execute SVAP on nuclear facilities to check facility safeguard systems for soundness and to reveal vulnerabilities, if any. The ultimate objective is to create safeguard systems that will effectively deter theft or diversion of special nuclear materials.

NUREG/CR-1169-V-1 PC **A08**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Safeguard Vulnerability Analysis Program (SVAP) Data-Gathering Handbook. Volume I,
P. S. Wahler. Apr 80, 172p UCRL-52731-VOL-1
See also Volume 2, NUREG/CR-1169-V-2, and Executive Summary, NUREG/CR-1169-EX-SUM.

The data-gathering procedure for Safeguard Vulnerability Analysis Program (SVAP) is demonstrated on a simplified, hypothetical nuclear facility. Data typical to any safeguard assessment are gathered from the facility and entered in the handbook--an example of which makes up the appendix of this report--in response to a sequence of questions. The data so gathered are then rearranged in the second part of the handbook--a process called recording. In a subsequent phase of SVAP, computer programs return results to the analyst on vulnerabilities in the facility's safeguard system.

NUREG/CR-1169-V-2 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Safeguard Vulnerability Analysis Program (SVAP) Data Gathering Handbook. Volume II,
P. S. Wahler. Apr 80, 62p UCRL-52731-VOL-2
See also Volume 1, NUREG/CR-1169-V-1, and Executive Summary, NUREG/CR-1169-EX-SUM.

Blank data collection forms for Safeguard Vulnerability Analysis Program (SVAP) are provided in this volume.

NUREG/CR-1178 PC **E04**/MF **A01**
Sandia Labs., Livermore, CA.
SABRES II: Code Description and Users Manual.
Technical rept.,
Pascal De Laquil, III. Mar 80, 124p SAND-79-8268
Contract NRC-60-78-096
Document includes 3 sheets of 48X reduction microfiche. See also PB-291 852.

SABRES II is an individual resolution computer simulation of combat between two small groups using small arms weapons. The model is designed to simulate a battle between the protective force of a special nuclear material (SNM) transportation convoy and an adversary force attempting to steal the material. The usefulness of the model lies in its ability to compare, in a consistent manner, the relative value of the variations in the characteristics of an SNM transportation physical protection system. Two versions of the SABRES II model are described. An interactive version, allowing the user to control the movement of all combatants, aids in the generation of plans and tactics to be followed by each force during the conflict. A Monte Carlo version of the model, using the interactive plans and tactics derived from multiple simulations of the scenario, generates statistical analysis of the simulated conflict.

NUREG/CR-1179 PC **A07**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Application of the Coupled Fluid-Structure Code PELE-IC to Pressure-Suppression Analysis - Annual Report to NRC for 1979.
Technical rept.,
W. H. McMaster, D. F. Quinones, C. S. Landram, D. M. Norris, Jr., and E. Y. Gong. May 80, 143p UCRL-52733

This report concludes a developmental effort to obtain a two-dimensional or axisymmetric computer code that calculates fluid-structure interaction problems in boiling-water-reactor (BWR) pressure-suppression systems. In this report several verification problems are concluded and applications to the Mark I and Mark II pressure-suppression systems are presented.

NUREG/CR-1219 PC **A06**/MF **A01**
Battelle Columbus Labs., OH.
Analysis of the Three Mile Island Accident and Alternative Sequences,
R. O. Wooton, R. S. Denning, and P. Cybulskis. Jan 80, 113p
Contract NRC-04-76-293-08

Analyses were performed with the MARCH computer code to examine a number of variations in system operation in the TMI accident to evaluate their effect on the extent of core damage. In addition to the analysis of alternative accident sequences a consistent interpretation of the thermal and hydraulic behavior during the first sixteen hours has been developed, potential containment failure modes for accidents involving complete core meltdown have been examined, and the vulnerability of different types of containment designs to hydrogen explosion has been evaluated.

NUREG/CR-1226 PC **E01**/MF **A01**
Sandia Labs., Albuquerque, NM.
POST: A Subroutine for Path Ordering of Sabotage Targets,
Bernie L. Hulme, and Christine A. Morgan. May 80, 25p SAND-80-0058

POST is a subroutine which a safeguards analyst may use to find multiple-target sabotage paths through a fixed-site facility. This subroutine accepts the same weighted digraph facility model as does ADPATH, the single-target adversary path code. Given a list of potential starting nodes and a list of one set of target nodes together with their respective guard-response times, POST computes an adversary's minimum interruption probability path. This path begins at one of the starting nodes and passes through all of the given target nodes in such a way as to minimize the adversary's probability of being detected while the guards still have time to respond to an alarm and interrupt the sabotage.

NUREG/CR-1248 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Water Reactor Safety Research Division.
Quarterly progress rept. 1 Jul-30 Sep 79,
Anthony J. Romano, D. J. Diamond, W. G. Shier, Jr., O. C. Jones, Jr., and D. van Rooyen. May 80, 93p BNL-NUREG-51131
Contract DE-AC02-76CH00016
See also NUREG/CR-1035.

The Water Reactor Safety Research Programs Quarterly Report describes current activities and technical progress in the programs at Brookhaven National Laboratory sponsored by USNRC Division of Reactor Safety Research. The projects reported each quarter are the following: LWR thermal hydraulic development, advanced code evaluation, TRAC code assessment, and stress corrosion cracking of PWR steam generator tubing.

NUREG/CR-1249 PC **A06**/MF **A01**
Brookhaven National Lab., Upton, NY.
Advanced Reactor Safety Research Division.
Quarterly progress rept. 1 Jul-30 Sep 79,
Anthony J. Romano, Ashok K. Agrawal, Owen C. Jones, Jr., Ralph J. Cerbone, and Cesar Sastre. May 80, 120p BNL-NUREG-51130
Contract DE-AC02-76CH00016
See also NUREG/CR-1036.

This quarterly report describes current activities and technical progress during January-March 1980 in the Advanced Reactor Safety Research Program. The projects reported this quarter are: HTGR safety evaluation, SSC code development, LMFBR safety experiments, and fast reactor safety code validation.

NUREG/CR-1250-V-2-PT2 PC **A99**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Three Mile Island Special Inquiry Group.
Three Mile Island: A Report to the Commissioners and to the Public. Volume II, Part 2.
5 Apr 79, 615p
See also Volume 2, Part 1, NUREG/CR-1250-V-2-PT1, and Volume 2, Part 3, NUREG/CR-1250-V-2-PT3.Color illustrations reproduced in black and white.

This is the second of three parts of the second volume of a study of the Three Mile Island accident. Part 2 of Volume II focuses on a technical description of the accident.

NUREG/CR-1250-V-2-PT3 PC **A21**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Three Mile Island Special Inquiry Group.
Three Mile Island: A Report to the Commissioners and to the Public. Volume II, Part 3.
5 Apr 79, 477p
See also Volume 2, Part 2, NUREG/CR-1250-V-2-PT2.

This is the third and final part of the second volume of a study of the Three Mile Island accident. Part 3 of Volume II contains descriptions and assessments of responses to the accident by the utility and by the NRC and other government agencies.

NUREG/CR-1311 PC **A11**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Experiment Data Report for LOFT Nuclear Small Break Experiment L3-2,
Mary L. McCormick-Barger, Janice M. Carpenter, J. Bruce Marlow, and Scott A. Ploger. May 80, 229p EGG-2016
Contract DE-AC07-76IDO1570
See also NUREG/CR-1145.

Experiment L3-2 was the second nuclear small break loss-of-coolant experiment conducted at the Loss-of-Fluid Test facility. The primary objectives of the experiment were to obtain data for analytical code assessment and to further the understanding of the thermal-hydraulic behavior which occurs during a postulated loss-of-coolant accident in a pressurized water reactor. Additional objectives of the experiment were to determine emergency core cooling system performance, determine any unexpected thresholds or events, determine how effectively typical process instrumentation indicated the true system condition, and define variations in system design or plant operation that could mitigate small break transient phenomena. The experiment successfully accomplished the objectives.

NUREG/CR-1323 PC **A05**/MF **A01**
Argonne National Lab., IL. Components Technology Div.
Simulation of a Thermohydraulic Transient in a Pipe Using the COMMIX-1A Computer Code.
Technical memorandum,
M. J. Chen, H. M. Domanus, and W. T. Sha. Apr 80, 83p ANL-CT-80-15

The numerical simulation of a section of LMFBR intermediate pipe loop during a typical CRBR scram has been carried out using the COMMIX-1A computer code. COMMIX-1A is a three dimensional, transient, single-phase component computer code with both Cartesian and cylindrical coordinates for thermal hydraulic analysis. A considerable top to bottom temperature difference in the pipe is found as a result of flow stratification. The top to bottom temperature difference can be as high as approximately 50% of the temperature difference of the forcing function employed in the transient.

NUREG/CR-1329 PC **A02**/MF **A01**
Sandia Labs. Albuquerque, NM.
Physical Protection of Nuclear Facilities.
Quarterly progress rept. Oct-Dec 79,
L. D. Chapman. May 80, 16p

All of the activities during the past quarter were related to the facility characterization and evaluation methodology development efforts. The principal facility characterization activities included: (1) the vital area analyses of operating reactor facilities; (2) support for studies of the Three Mile Island incident; and (3) the development of importance measures for rank ordering vital areas. Evaluation methodology work concentrated on continued development the Safeguards Automated Facility Evaluation (SAFE) methodology and contractor support related to the Safeguards Network Analysis Procedures (SNAP) applications.

NUREG/CR-1353 PC **A07**/MF **A01**
Los Alamos Scientific Lab., NM.
Preliminary Calculations Related to the Accident at Three Mile Island,
J. R. Ireland, P. K. Mast, T. R. Wehner, P. B. Bleiweis, and W. L. Kirchner. Apr 80, 135p LA-8273-MS
Contract W-7405-eng-36

The Three Mile Island nuclear plant (TMI-2) was modeled using the Transient Reactor Analysis Code (TRAC-PIA) and a preliminary calculation, which simulated the initial part of the accident that occurred on March 28, 1979, was performed. The purpose of this calculation was to provide a better

understanding of the system thermal-hydraulic and core thermal-mechanical response during the first 3 hours and to evaluate how well TRAC compared to the overall accident scenario and measured system parameters. As a result of this base-case calculation, several parametric calculations were performed to investigate hypothetical variations to the TMI-2 accident sequence to determine the significance of system/operator actions on the course of the accident. Finally, based upon the results of the base-case calculation, estimates were made regarding the extent of core damage and the amount of hydrogen produced as a result of the zirconium-steam reaction.

NUREG/CR-1360 PC **E04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Reactivity Initiated Accident Test Series RIA Scoping Tests Fuel Behavior Report,
R. Scott Semken, Shu Shiozawa, Zoel R. Martinson, Richard K. McCardell, and Philip E. MacDonald. May 80, 104p EGG-2024
Contract DE-AC07-76IDO1570

This report discusses the results from the Reactivity Initiated Accident Scoping Test conducted in the Power Burst Facility (PBF) at the Idaho National Engineering Laboratory. Four unirradiated test fuel rods were subjected, one during each of the four tests, to one or more power transients resulting in estimated axial peak radial average fuel enthalpies ranging from 185 to 350 cal/g (205 to 530 cal/g peak fuel enthalpy near the pellet surface). The test objectives were to: (a) evaluate proposed methods for measuring fuel rod energy deposition during a power burst; (b) determine the peak fuel enthalpy threshold for failure and the rod failure mechanism of unirradiated fuel rods at BWR hot-startup coolant conditions; (c) determine the relative sensitivity of test instrumentation to high radiation during a power burst; and (d) determine the magnitudes and sources of pressure pulses resulting from rod failure during an inadvertent high energy deposition in the PBF liquid-filled test loop.

NUREG/CR-1366 PC **A99**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Nuclear Energy Systems Div.
PWR FLECHT SEASET Steam Generator Separate Effects Task Data Report.
Rept. no. 4,
R. C. Howard, M. F. McGuire, and L. E. Hochreiter. Apr 80, 664p
Contract NRC-04-77-127

This report presents data from the Steam Generator Separate Effects Task of the Full-Length Emergency Cooling Heat Transfer Separate Effects and Systems Effects Test Program (FLECHT SEASET). In this task a series of heat transfer tests were run on a model steam generator operating under simulated loss-of-coolant conditions. The model steam generator was made up of 32 full-length U-tube instrumented with thermocouples to measure secondary fluid, tube/wall, and primary steam temperatures. The separate effects tests measured steam generator bundle heat transfer with known boundary conditions to provide better understanding of the steam generator behavior in the systems effects tests. The test results presented in this report will be evaluated in a subsequent evaluation report.

NUREG/CR-1371 PC **A05**/MF **A01**
Argonne National Lab., IL.
Physics of Reactor Safety.
Quarter rept. Oct-Dec 79.
May 80, 81p ANL-80-25
See also NUREG/CR-1252.

This Quarterly Progress Report summarizes work done during the months of October-December 1979 in Argonne National Laboratory's Applied Physics and Components Technology Divisions for the Division of Reactor Safety Research of the U.S. Nuclear Regulatory Commission. The work in the Applied Physics Division includes reports on reactor safety modeling and assessment by members of the Reactor Safety Appraisals Section. Work on reactor core thermal-hydraulics is performed in ANL's Components Technology Division, emphasizing 3-dimensional code development for LMFBR accidents under natural convection conditions. An executive summary is provided including a statement of the findings and recommendations of the report.

NUREG/CR-1382 PC **A04**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Summary Report of Fuel Rod Displacement Sensor for LOFT,
T. R. Billeter. Apr 80, 52p HEDL-TME-80-17

Qualification tests and operational characteristics of a displacement sensor are described. As a transducer to be used for measurement of axial motion of fuel rods in the LOFT reactor during a blowdown transient, the test environment included temperatures to 800 degrees F and 2500 psig applied pressure. In addition, the transducer withstood transient tests in an autoclave and in a quench bath. All of the three units tested survived the rigorous test sequence of about 700 hours duration.

NUREG/CR-1444 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
Investigation of Distorted-Geometry Simulation of Pool Dynamics in Horizontal-Vent BWR Containments.
Topical rept.,
N. G. Ruggieri, and A. A. Sonin. Apr 80, 80p

Experiments were conducted to investigate the accuracy of distorted-geometry testing of pool dynamics in horizontal-vent BWR containments. Distorted-geometry testing implies testing in systems where the flow-wise dimensions are full scale, but all dimensions transverse to the flow are reduced in the same proportion. The assumption is that flow velocities, pressures and other thermodynamic properties can be interpreted as being the same in the distorted-geometry system as in its correctly proportioned counterpart. The experiments discussed in this report, which were done at small scale using the established scaling laws, showed that the geometric distortions can have a significant effect on the pool swell under conditions which are roughly representative of horizontal-vent BWR containment systems during a LOCA.

NUREG-0641 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Operating Reactors.
Control Rod Guide Tube Wear in Operating Reactors; Operating Experience Report.
Technical rept. Dec 77-Dec 79,
R. Riggs. Apr 80, 82p

Evidence of control rod guide tube wear has been observed in operating pressurized water reactors. The cause of this wear is identified as flow-induced vibration of the control rods. This report describes the measures being taken by both the industry and the NRC to deal with this matter. The staff also presents its technical positions and requirements to support continued operation of the plants as of December 1979 pending completion of this generic effort.

NUREG-0667 PC **A12**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Transient Response of Babcock and Wilcox-Designed Reactors.
May 80, 270p

On February 26, 1980, the Crystal River Unit No. 3 Nuclear Generating Plant, designed by the Babcock and Wilcox Company (B and W), experienced an incident involving a malfunction in an instrumentation and control system power supply. Faced with the Crystal River Unit 3 incident and the apparently high frequency of such near similar types of transients in other B and W designed plants, a special Task Force was established within the Office of Nuclear Reactor Regulation to provide an assessment of the apparent sensitivity of the B and W designed plants to such transients and the consequences of malfunctions and failures of the integrated control system and non-nuclear instrumentation. This report provides an assessment of these issues.

NUREG-0677 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Systems Safety.
The Probability of Intersystem LOCA: Impact Due to Leak Testing and Operational Changes.
Technical rept.,
Mark P. Rubin. May 80, 33p

The Reactor Safety Study (WASH-1400) identified the potential intersystem LOCA in a pressurized water reactor as a significant contributor to the risk resulting from core melt. Similar scenarios are also possible in boiling water reactors. This report evaluates various pressure isolation valve configurations used in reactors to determine the probability of intersystem LOCA. It is shown that periodic leak testing of these valves can substantially reduce intersystem LOCA probability. Specific analyses of the high pressure/low pressure interfaces in the Sequoyah (PWR) and Alan B. Barton (BWR) plants show that periodic leak testing of the pressure isolation check valves will reduce the intersystem LOCA probability to below 0.000001 per year.

ORNL/CSD/TM-106 PC **A06**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Criticality Analyses of Disrupted Core Models of Three Mile Island Unit 2.
R. M. Westfall, J. T. West, G. E. Whitesides, and J. T. Thomas. Dec 79, 111p
Contract W-7405-ENG-26

Three hypothetical disrupted core models were analyzed for the President's Commission on the Accident at Three Mile Island. Soluble boron in the present configuration was assumed to be 3180 weight parts per million (wppM). Positive reactivity effects due to fuel swelling, fuel slumping, and coolant displacement by ZrO sub 2 increase the cold, shutdown system multiplication factor from approximately 0.74 to 0.86. The increase in reactivity for the three models can be roughly correlated with a decrease in the borated water-to-fuel volume ratio. Each of the 39,825 pin-lattice locations was modeled explicitly in the Monte Carlo analyses of the reactor core. Parametric studies were performed with one-dimensional discrete-ordinates analyses. The report includes a benchmark critical analysis of the system at hot, zero-power startup, a description of the analytical methods used, and a comprehensive compilation of the data upon which the analytical models were based. (ERA citation 05:013611)

ORNL/SUB-7494/1 PC **A07**/MF **A01**
Westinghouse Nuclear Energy Systems, Pittsburgh, PA.
NASAP: A Computer Code for the Evaluation of the Non-Proliferation Alternative Systems Assessment Program Concepts. Final Report in Support of Task 2.
B. A. Maul. Sep 79, 143p WCAP-9539
Contract W-7405-ENG-26

The Non-Proliferation Alternative Systems Assessment Program (NASAP) computer code was developed to calculate the LWR and NASAP choice reactor cost through an arbitrary year T/sub N/. The final cost is arrived at by calculation of cost contributory factors for both LWR and NASAP choice reactors. (ERA citation 05:013582)

ORNL/TM-7043 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
ORCULT-I: A Loop Dynamics Simulator Program for the Core Flow Test Loop.
S. J. Ball. Feb 80, 58p
Contract W-7405-ENG-26

A digital simulation program, ORCULT-I, was developed to predict both the steady-state and transient behavior of the core flow test loop (CFTL). ORCULT has been used to answer design questions concerning loop configurations, operating modes, bundle tests, and postulated loop-accident conditions. The CFTL is a thermal-hydraulic and structural test vehicle for performance evaluations of Gas-Cooled Fast-Breeder Reactor (GCFR) fuel-rod bundle designs. The status, capabilities, and limitations of ORCULT are described, and several sample transients are shown which demonstrate characteristics of CFTL behavior. The appendix of the report includes derivations of the model equations used in ORCULT. (ERA citation 05:013560)

ORNL/TM-7091 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Analysis of Fission-Product Effects in a Fast Mixed-Spectrum Reactor Concept.
J. R. White, and T. J. Burns. Feb 80, 35p

Contract W-7405-ENG-26

The Fast Mixed-Spectrum Reactor (FMSR) concept has been proposed by BNL as a means of alleviating certain nonproliferation concerns relating to civilian nuclear power. This breeder reactor concept has been tailored to operate on natural uranium feed (after initial startup), thus eliminating the need for fuel reprocessing. The fissile material required for criticality is produced, in situ, from the fertile feed material. This process requires that large burnup and fluence levels be achievable, which, in turn, necessarily implies that large fission-product inventories will exist in the reactor. It was the purpose of this study to investigate the effects of large fission-product inventories and to analyze the effect of burnup on fission-product nuclide distributions and effective cross sections. In addition, BNL requested that a representative 50-group fission-product library be generated for use in FMSR design calculations. (ERA citation 05:013561)

PB80-171275 PC **A07**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
A Condensed Review of Nuclear Reactor Thermal-Hydraulic Computer Codes for Two-Phase Flow Analysis,
M. Kazimi, and M. Massoud. Feb 80, 135p MIT-EL-79-018
Sponsored in part by Boston Edison Co., MA., Consumers Power Co., Jackson, MI., Northeast Utilities Service Co., Hartford, CT., and Public Service Electric and Gas Co., Newark, NJ.

A review is made of the computer codes developed in the U.S. for thermal-hydraulic analysis of nuclear reactors. The intention of this review is to compare these codes on the basis of their numerical method and physical models with particular attention to the two-phase flow and heat transfer characteristics. A chronology of the most documented codes such as COBRA and RELAP is given. The features of the recent codes such as RETRAN, TRAC, and THERMIT are also reviewed. The range of application as well as limitations of the various codes are discussed.

PB80-171283 PC **A08**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Development of a Method for BWR Subchannel Analysis,
A. Faya, L. Wolf, and N. Todreas. Nov 79, 174p MIT-EL-79-027

This study deals with the development of CANAL, a computer program for steady-state and transient BWR subchannel analysis. The conservation equations for the subchannels are obtained by area-averging of the two-fluid model conservation equations and reducing them to the drift-flux model formulation. The conversion equations are solved by a marching type technique which limits the code to analysis of operational transients only. The transfer of mass, momentum, and energy between adjacent subchannels is split into diverse cross-flow and turbulent mixing components. The transfer of mass by turbulent mixing is assumed to occur in a volume-for-volume scheme reflecting experimental observations. The phenomena of lateral vapor drift and mixing enhancement with flow regime are included in the program.

PB80-175516 PC **A06**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
CANAL User's Manual,
A. Faya, L. Wolf, and N. Todreas. Nov 79, 102p MIT-EL-79-028

CANAL is a subchannel computer program for the steady-state and transient thermal hydraulic analysis of BWR fuel rod bundles. The purpose of this manual is to introduce the user into the mechanism of running the code by providing information about the input data and options.

PNL-SA-6921 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Understanding Public Perspectives on Nuclear Energy.
B. D. Melber, and W. L. Rankin. May 78, 31p CONF-780622-83
Contract EY-76-C-06-1830
ANS annual meeting, San Diego, CA, USA, 18 Jun 1978.

The levels of and underlying bases for public support, opposition, and ambivalence toward continued nuclear power development are reviewed. Data are presented on the public's general evaluations of nuclear power by indicating the extent of support and opposition, by discussing the interpretation of undecided responses, and by examining changes in public opinion over time. Differences in general attitudes toward nuclear energy related to demographic characteristics, including sex, age, education, income, and geographic region are examined. Bases for explaining public support of and opposition to nuclear power are discussed by identifying consistent patterns of attitudes among pronuclear individuals and among antinuclear individuals in the general public. (ERA citation 05:011869)

PNL-2666 PC **A04**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Analysis of Print Media Coverage of Nuclear Power Issues.
W. L. Rankin, S. M. Nealey, and D. E. Montano. Apr 78, 67p
Contract EW-78-C-06-1076

224 newspaper articles were sampled from four newspapers, extrapolating to about 2850 nuclear power articles from 1972 to 1976. 124 magazine articles were found in four magazines (Time, Business Week, Scientific American, Environment). The newspapers wee found to run close coverage of nuclear power issues. The articles were mainly (45%) focused on reactors and reactor operation. The articles were judged to be antinuclear more often than pronuclear (only Scientific American discussed benefits more than costs). The same general conclusion was reached for articles on nuclear waste management. (ERA citation 05:012007)

PNL-3249 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Mass Flows for LMFBRs Fueled with Various Types of Plutonium and Fertile Material.
U. P. Jenquin. Dec 79, 39p
Contract EY-76-C-06-1830

Results are presented of neutronics analyses performed to determine fueling requirements and mass flows for a typical 1200 megawatt electric (MWe) liquid metal fast breeder reactor (LMFBR). In performing the analyses, three plutonium compositions were considered to fuel the reactor. The composition depended on the amount of irradiation either a UO sub 2 or PuO sub 2 -ThO sub 2 fuel had received in a light water reactor (LWR). Uranium and thorium fertile materials were considered. Calculations were performed to determine the cross sections, reactivity, and burnup for each fuel-fertile material configuration. Based on these calculations, the mass flows, plutonium enrichment requirements, and breeding ratios for each configuration were determined. (ERA citation 05:013562)

RISO-M-2111 PC **A04**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Adoption of the Heat Reactor in Denmark.
H. V. Larsen. Sep 78, 68p
In Danish.
U.S. Sales Only.

An evaluation of the suitability of the Swedish-Finnish heat reactor SECURE for introduction into Denmark. An assessment is made of whether there is a sufficiently large requirement for heat to be able to use this reactor. In addition, an economical comparison is carried out with the types of heat-producing plants with which SECURE would compete in Denmark - namely a LWR power plant with pass-out turbine, a coal-fired power plant with pass-out turbine, a coal-fired back pressure power plant, as well as with oil-fired district-heating plants. Also an oil-fired power plant with pass-out turbine, an oil-fired back-pressure power plant, and coal-fired district-heating plants are considered briefly. (Atomindex citation 10:463790)

SAND-79-2242/1 PC **A12**/MF **A01**
Sandia Labs., Albuquerque, NM.
Fixed Site Neutralization Model Programmer's Manual. Volume 1.
D. Engi, L. Chapman, W. Judnick, R. Blum, and L. Broegler. Dec 79, 275p
Contract EY-76-C-04-0789

The Fixed Site Neutralization Model (FSNM) is a stochastic, time-stepped simulation of an engagement process whereby an adversary force attempts to steal or sabotage sensitive (e.g., nuclear) materials being guarded by a security force on a fixed site and a response force that is off-site. FSNM will assist regulatory bodies of the US Government in evaluating fixed site physical protection systems at various installations in a variety of scenarios. Most data input to the Fixed Site Neutralization Model are in binary form. The user's data are transformed into binary form by two supporting modules, the Data Preprocessor (DPP) and the Plex Preprocessor (PPP). Both preprocessors and the FSNM itself are written in FORTRAN. This volume of the program maintenance program contains: introduction, logic descriptions, PLEX data structure, PLEX records, dictionaries, and error conditions and comments. (ERA citation 05:013188)

SAND-79-7038 PC **A02**/MF **A01**
Lovelace Medical Foundation, Albuquerque, NM. Clinical Research Div.
Development of an Automated Stress/Duress Detection System, Phase I and Phase II. Summary Report.
W. C. Tuttle, J. G. Davis, E. R. Greene, and J. A. Loeppky. Dec 79, 13p
Contract EY-76-C-04-0789

This study showed that remote analysis of heart rate has potential as an effective means for automatic detection of stress in guards. The analysis of the data suggests that a heart rate greater than either CHR (criterion heart rate) + 20% (as established in the exercise test) or 150 bpm is the best criterion for initial establishment of alarm criteria. (ERA citation 05:015018)

UJV-4157-T PC **A03**/MF **A01**
Ustav Jaderneho Vyzkumu, Rez (Czechoslovakia).
Results of Measuring Local Hydrodynamic Characteristics of Geometrically Disturbed Rod Bundle. II.
J. Hejna, J. Cervenka, and F. Mantlik. Jul 78, 45p
In Russian.
U.S. Sales Only.

The results are shown of measuring pressure drop due to friction, velocity field and shear stress distribution around the wetted circumference in a rod bundle with the displaced central rod. The measurement was conducted on a 19-rod aerodynamical model with the Reynolds number Resub(k)=137 400. The friction pressure drop coefficient was found to be little dependent on the central rod displacement. The dependence is given of an uneven distribution of shear stresses on rod displacement. The applicability is confirmed of the universal law of the distribution of velocity component normal to the wetted surface. The region of the rod displacement effect on hydrodynamic characteristics does not exceed the immediate neighbourhood of the displaced rod. In damaged rod lattices the secondary flow effect is markedly felt on the transverse momentum transfer. (Atomindex citation 10:463516)

VTT-YDI-33 PC **A04**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Otaniemi (Finland). Ydinvoimatekniikan Lab.
TRAWA, A Transient Analysis Code for Water Reactors. Supplementary Part 1.
R. Raiko, and M. Rajamaeki. Apr 78, 54p
U.S. Sales Only.

TRAWA is a transient analysis code for water reactors. This report includes modifications, extensions and supplements which have been made into TRAWA after the publication of the first report. The most important subjects are film boiling heat transfer model, mathematical treatment of source terms in hydraulic conservation equations, and new input/output capabilities. The directions for the user facilitate the choice and the checking of input values and aid in the application of the program to various situations. (Atomindex citation 10:463831)

VTT-YDI-40 PC **A02**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Otaniemi (Finland). Ydinvoimatekniikan Lab.
NUSTRA - Optimization Code for Nuclear Reactor Strategies.
E. Tusa, and J. Vira. Feb 79, 20p
U.S. Sales Only.

A computer code is designed to solve the optimal reactor strategy corresponding to a given nuclear power program. As a novel feature the code includes capabilities for explicit uncertainty resolution. After a short description of the calculation methods this report gives the input instructions for the code. (Atomindex citation 10:463833)

WAPD-TM-1336 PC **A08**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Results of Initial Nuclear Tests on LWBR (LWBR Development Program).
W. K. Sarber. Jun 79, 173p
Contract EY-76-C-11-0014

This report presents and discusses the results of physics tests performed at beginning of life on the Light Water Breeder Reactor (LWBR). These tests have confirmed that movable seed assembly critical positions and reactivity worths, temperature coefficients, xenon transient characteristics, core symmetry, and core shutdown are within the range of values used in the design of the LWBR and its reactor protection analysis. Measured core physics parameters were found to be in good agreement with the calculated values. (ERA citation 05:013565)

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AAEC/PR-44U PC **A02**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Nuclear Science and Technology Branch Report 1977. Uranium Fuel Cycle Program.
C. J. Hardy. Dec 77, 15p
U.S. Sales Only.

A report of research programs continuing in the following areas is presented: mining and treatment of uranium ores, manufacture of uranium hexafluoride, uranium enrichment, waste treatment, reprocessing and the uranium fuel cycle. Staff responsible for each project are indicated. (Atomindex citation 10:476213)

AECL-5964 PC **A04**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Burnup Determination of Nuclear Fuels Using Neodymium-148.
T. T. Vandergraaf, L. M. Carefoot, and D. G. Boase. Jun 78, 54p
U.S. Sales Only.

A method is described for determining the burnup of uranium and thorium-uranium fuels by measuring the exp 148 Nd concentration in the fuel. The procedure involves separation of neodymium from dissolved, irradiated fuel by a combined liquid-liquid extraction/ion-exchange chromatography procedure followed by determination of exp 148 Nd by isotope dilution-mass spectrometry, using exp 142 Nd as isotopic diluent. Radiation exposure to the analyst is reduced considerably by removing exp 144 Ce/Pr, exp 134 Cs and exp 137 Cs in the early stages of the separation procedure. The precision of the method is better than 4% at the 2 exp + level and the bias between this method and burnup determination by exp 235 U depletion is 3%. This report describes the development of the neodymium separation procedure and includes detailed chemical separation and analysis procedures and the calculations required to determine the burnup. (Atomindex citation 09:413736)

COGEMA-CONF-77-1 PC **A02**/MF **A01**
Compagnie Generale des Matieres Nucleaires, Chatillon (France).
Extraction and Selective Stripping of Uranium and Molybdenum in Sulfate Solution Using Amines.
E. Sialino, C. Mignot, P. Michel, and J. Vial. 1977, 20p CONF-770907-7
International solvent extraction conference, Toronto, Canada, 9 Sep 1977.
U.S. Sales Only.

The uranium solutions issued from leaching of AKOUTA ores and containing lot of molybdenum are purified using solvent extraction. During the first test run precipitation of complexes such as amine phosphomolybdate was observed. It was pointed out that the precipitation could be prevented if the molybdenum is oxidized in the feed prior to solvent extraction. Informations on the basic studies carried out to ensure the reliability of the process are given in the complete paper. (Atomindex citation 09:410660)

DOE/TIC-11088 PC **A02**/MF **A01**
Kerr-McGee Corp., Oklahoma City, OK.
FFTF Driver Fuel Pellets: Typical Pellet Lot Data.
12p

Quality assurance data are presented for FFTF driver fuel pellets. (ERA citation 05:013597)

DP-R-349 PC **A02**/MF **A01**
Organization for Economic Co-Operation and Development, Winfrith (England). High Temperature Reactor Project.
Exploratory Experiments on the Feasibility of Th and Pu Sol-Gel Particles.
G. Vanhellemont, J. Beullens, and H. Bairiot. May 65, 18p
U.S. Sales Only.

The sol-gel process as developed by the O.E.C.D. Dragon Project has been applied by the Plutonium Project at Mol to determine the feasibility of producing spherical particles containing Th02, Pu02 and C, in the proportions necessary to fabricate thorium-plutonium carbide kernels for irradiation specimens and for fuel cartridges for the Dragon Reactor Experiment. The process has been extended successfully to the preparation of thorium and plutonium gels, having a significant excess of carbon, with the object of evaluating the feasibility of the sol-gel process for the production of Th, C-10 type kernels. Other experiments have been performed to test the feasibility of incorporating U02 powder into the gel spheres. By using this technique, U to Th ratios of up to 9:1 have been obtained. (Atomindex citation 10:490678)

DP-R-350 PC **A04**/MF **A01**
Organization for Economic Co-Operation and Development, Winfrith (England). High Temperature Reactor Project.
Reviews of Investigations on the Coating of Fuel Particles.
J. R. C. Gough, and D. Kern. Jun 65, 58p
U.S. Sales Only.

The primary development of the technology of coating fuel particles for the Dragon Reactor Experiment has been previously reported. This paper gives the results of investigations into the role of the coating parameters and the relationships between these parameters during the deposition of pyrolytic carbon of various structures. The deposition of silicon carbide interlayers is described and the effect of these interlayers is included in data on the surface contamination of coated particle fuel. For the sake of completeness, summaries of relevant information previously published in Dragon Project reports are included in the present review. (Atomindex citation 10:490659)

EUR-5669 PC **A04**/MF **A01**
Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements.
Automatic Evaluation of Isotope Analysis of Nuclear Fuels Including Isotope Dilution, Mass Spectrometry, alpha Spectrometry and Isotope Correlation Technique with an Appropriate Databank.
B. Brandalise, G. Cottone, A. Cricchio, F. Gerin, and L. Koch. 1977, 72p
U.S. Sales Only.

Isotope analyses of nuclear fuels are automatically evaluated. For this purpose, the source data obtained by isotope dilution, mass spectrometry and alpha spectrometry are reduced on-line. These values are intermediately stored in a matrix corresponding to the analysis type. After collection of all data, they are automatically evaluated in respect to their isotopic content and burn-up of the fuel. In order to check the consistency of post-irradiation data, the isotope correlation technique using an appropriate databank, is employed. On the first hand, the programmes have been primarily developed in view of a tamper resistant data treatment for nuclear material safeguards. In addition, however, the automatic on-line evaluation speeds up each analysis and increases the analysis output. (Atomindex citation 10:422878)

IEA-DT-114 PC **A03**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Determination of Gas Residues in Uranium Dioxide Pellets.
H. G. Riella. Dec 78, 43p
In Portuguese.Thesis.
U.S. Sales Only.

The measurement of low amounts of residual gases, excluding water, in ceramic grade uranium dioxide pellets, using high temperature vacuum extraction technique, is dealt with. The high temperature extraction gas analysis apparatus was designed and assembled for sequential analysis of up to eight uranium dioxide pellets by run. The system consists of three major units, namely outgassing unit, transfer unit and analytical unit. The whole system is evacuated to a final pressure of less then 10 exp -5 torr. A weighed pellet is transfered into the outgassing unit for subsequent dropping into a Platinum-Rhodium crucible which is heated inductively up to 1600 exp 0 C during 30 minutes. The released gases are imediately transfered from the outgassing to analytical unit passing through a cold trap at -95 exp 0 C to remove water vapor. The gases are transfered to previously calibrated volumetric bulb where the total pressure and temperature are determined. An estimate of the gas content in the pellets at STP condition is obtained from the measured volume, pressure and temperature of the gas mixture by applying ideal gases equation. Analysis to two lots (fourteen samples) of uranium dioxide pellets by the method described here indicated a mean gas content of 0,060cm exp 3 /g UO sub 2 . The lower limit of this technique is 0,03cm exp 3 /g UO sub 2 (STP). The time required for the analysis of eight pellets is about 9 hours. (Atomindex citation 10:476367)

IEA-495 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Div. de Engenharia Quimica.
Experimental Methods for Burn-Up Determination in Nuclear Fuels, 1. Neodymium - 148 Method.
J. F. de A.C. Taddei, and C. Rodrigues. Dec 77, 22p
In Portuguese.
U.S. Sales Only.

A method is presented that allows the calculation of the total percentage of atoms having undergone fission ('burn up') in nuclear fuels, from the measurement of absolute amounts of fission product neodymium-148 and of uranium and plutonium present in the spent fuel, the fission yield of neodymium-148 being known. These measurements are performed through the mass spectrometry- isotope dilution technique. (Atomindex citation 09:414124)

INIS-mf-3969 PC **A11**/MF **A01**
Universidad Complutense de Madrid (Spain). Facultad de Ciencias Quimicas.
Study of the Volatilization-Excitation Phenomena Affecting to the Efficiency of Spectrochemical Buffers Applied to Uranium Ore Analysis.
J. P. Diaz-Guerra Gonzalez. 1977, 231p
In Spanish.Thesis.
U.S. Sales Only.

A direct-current arc emission spectroscopy method allowing the determination of Al Ca, Fe, Mg, Mn, Na, P, Si and Ti in uranium ores and geological materials has been developed by studying the efficiency of Ag sub 2 O, BaCO sub 3 , Bi sub 2 O sub 3 , CuF sub 2 , CuO, Ga sub 2 O sub 3 , GeO sub 2 , graphite, K sub 2 CO sub 3 , Li sub 2 B sub 4 O sub 7 , Li sub 2 CO sub 3 , Ni, PbS, Sb sub 2 O sub 4 , SrCO sub 3 , Tl sub 2 O sub 3 and ZnO as spectrochemical buffers. Volatilization-excitation mechanisms of Li sub 2 CO sub 3 : graphite, GeO sub 2 : graphite and SrCO sub 3 : graphite buffer mixtures have been specially considered. Proce-

dures to investigate phenomena taking place in the electrode, anodic load and arc plasma have been selected. Intensity-time curves; voltage variation between electrodes; vapour diffussion through the electrode walls; load depletion; reaction products formation and temperature, electron pressure and ionization degree in the arc plasma have been studied. Measurements of plasma parameters are performed by introducing thermometric and manometric species in both the anode and the cathode electrodes. The effects of different alkalin matrices on transportation phenomena are also considered. Emission efficiency of some analytical lines has been investigated by the application of a mathematical model enclosing fundamental parameters of the arc plasma. Efficiency of scattered primary X-rays of various wavelengths has been studied as a correction of matrix effects in the uranium determination. Results illustrate that the incoherently-scattered MoK beta sub(1,3) radiation is the optimum reference line. (Atomindex citation 09:369536)

INIS-mf-4108 PC **A04**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Study of Plutonium Sorption in Aluminia Column in the System HNO sub 3 -HF. Application to the Recovery of Plutonium in Solutions from the Treatment of Irradiated Nuclear Fuel.
J. A. de Araujo. 1977, 62p
In Portuguese.
U.S. Sales Only.

The column chromatographic method using alumina has been applied successfully to study the sorption-desorption behavior of plutonium traces in HNO sub 3 -HF and HNO sub 3 -HF-UO sub 2 (NO sub 3) sub 2 systems, aiming to elaborate a process for recovering plutonium traces from reprocessing wastes, mainly in existing solutions where uranium is presented in macro quantities. Basically, the method consists in the sorption of plutonium by percolating a solution containing HNO sub 3 (0.1 to 0.8M) or uranyl nitrate (1-50 gU/l) and HF(0,1 to 0.3M) through an Al sub 2 O sub 3 column. The plutonium is fixed on Al sub 2 O sub 3 whereas the uranyl ions are collected in the effluent. The adsorption of Pu-III, Pu-IV and Pu-VI in the presence of HF was determined and Pu-IV can be almost completely sorbed. The Pu-IV is eluted by reduction to Pu-III in the column using 3 M HNO sub 3 -0.005M FeSO sub 4 at 50 exp 0 C as elutrient. This method is very simple and can be applied for separation and purification of plutonium (traces) from uranyl nitrate or other solutions coming from wet chemistry of irradiated fuels. (Atomindex citation 09:365088)

INIS-mf-5312 PC **A02**/MF **A01**
Australian Inst. of Energy, Sydney.
Energy Content of Unused Uranium in the Current Nuclear Fuel Cycle.
F. H. Carr. 1979, 3p
U.S. Sales Only.

Fuel utilisation in the current nuclear fuel cycle is relatively low, but this shortcoming will be vastly improved with the advent of the breeder type reactor system. Meanwhile, stockpiles of processed uranium in the form of tails from the enrichment plants are accumulating. These carry no inventory charges and constitute a valuable energy resource for the future. (Atomindex citation 10:492288)

LA-8084 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Automated Determination of Irradiated Fuel Pin Centerlines for gamma Scanning.
B. K. Barnes, J. N. Quintana, and A. S. Murray. Jan 80, 10p
Contract W-7405-ENG-36

A method is described for calculating the centerlines of irradiated fuel pins to be analyzed by gamma scanning. Fuel pin centering has been automated by computer control through a CAMAC link to the scanning mechanism. Rapidity and accuracy of the gamma scanning process have been improved by replacing the former trial and error method with this automated technique. (ERA citation 05:014117)

NUREG/CR-1197 PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Heavy-Section Steel Technology Program Quarterly Progress Report for July-September 1979.
G. D. Whitman, and R. H. Bryan. Apr 80, 104p
ORNL/NUREG/TM-370
Contract W-7405-eng-26
See also NUREG/CR-0980.

The Heavy-Section Steel Technology Program comprises studies related to all areas of the technology of the materials fabricated into thick-section primary-coolant containment systems of light-water cooled nuclear power reactors. The principal area of investigation is the behavior and structural integrity of steel pressure vessels containing cracklike flaws. Current work is organized into six tasks: (1) program administration and procurement, (2) fracture mechanics analyses and investigations, (3) effect of high-temperature primary reactor water on the subcritical crack growth of reactor vessel steels, (4) investigations of irradiated materials, (5) pressure vessel investigations, and (6) thermal shock investigations. A finite-element computer program for calculating mixed-mode stress-intensity factors for nozzle-corner flaws of arbitrary shape is being checked. A standard crack-arrest toughness testing method is being developed. Charpy impact and J-integral test data were obtained for irradiated weld metal. Preparations for an intermediate vessel test of low-upper-shelf material commenced. The first large-cylinder thermal shock test was performed.

RHO-LD-74 PC **A09**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Purex Process Solvent: Literature Review.
R. G. Geier. Oct 79, 185p
Contract EY-77-C-06-1030

This document summarizes the data on Purex process solvent presently published in a variety of sources. Extracts from these various sources are presented herein and contain the work done, the salient results obtained, and the original, unaltered conclusions of the author of each paper. Three major areas are addressed: solvent stability, solvent quality testing, and solvent treatment processes. 34 references, 44 tables. (ERA citation 05:013134)

18K. Reactor Physics

AECL-6355 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
TESHOM: A Users Manual.
J. Griffiths. Oct 78, 21p
U.S. Sales Only.

The TESHOM code and its associated data format is widely used to provide input data for lattice codes. Through TESHOM one data deck can be used to provide input to the LATREP, WIMS and POWDERPUFS lattice codes. The data format is described in detail, some of the principles behind the design of the code and its limitations are noted. (Atomindex citation 10:492354)

CEA-R-4907 PC **A08**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Eau.
Neutron Study of Fast Neutron Reactor Systems by Exponential Experiments on Harmonie - Graphite Program HUG-PHUG - Oxide Program PHRIXOS - Uranium Program UK.
Alain Desprets. Dec 77, 152p
In French.
U.S. Sales Only.

Exponential experiments allow the obtaining of fundamental characteristics of a lattice (material buckling, reaction rate ratios) more economically than critical experiments. This report describes the experimental techniques and the methods of analysis used for this type of experiments. The results obtained with three programs performed with the source reactor HARMONIE are given: graphite-lattices program (3 U-fueled and 3 Pu-fueled lattices); oxide-fuel program (4 PuO sub 2 -UO sub 2 lattices); pure uranium program (one lattice). Some of these lattices were also studied in critical experiments. The coherence of the results obtained by the two types of experiments is established. (Atomindex citation 10:463563)

JAERI-1256 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
FEM-BABEL: A Computer Program for Solving Three-Dimensional Neutron Diffusion Equation by the Finite Element Method.
T. Ise, Y. Nakahara, and T. Yamazaki. Mar 78, 84p
U.S. Sales Only.

The finite element method has been applied to solve accurately the multi-dimensional neutron diffusion equation on a modern computer. A new computer program FEM-BABEL has been developed by adopting the solution algorithm based on the Galerkin-type scheme. This three-dimensional program makes use of the combination of prism- and box-shaped elements to simulate reactor geometries efficiently. The successive over-relaxation method is adopted to solve the system equation and the inner iterations are accelerated using the coarse mesh rebalancing technique. Numerical calculations have demonstrated the present finite element method has advantages over the finite difference method for solving realistic three-dimensional problems in view of computing cost. (Atomindex citation 10:431124)

18M. Reactors (Non-Power)

ORNL/TM-7149 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Bulk Shielding Facility. Quarterly Report, April, May, and June 1979.
S. S. Hurt, E. D. Lance, and J. R. Thomas. Jan 80, 30p
Contract W-7405-ENG-26

The BSR operated at an average power level of 1967 kW for 72.58% of the time during April, May, and June. Water-quality control in both the reactor primary and secondary cooling systems was satisfactory. The BSR was operated at low and variable power during this quarter for 27.750 hours as part of the training programs for nuclear engineering students from the University of Tennessee. The PCA was also used in the above-mentioned training programs and was operated on one occasion when Mississippi State University students actively participated in training laboratories. The PCA was also operated on twenty-eight occasions for the Reactivity Determination using Spectra Density Measurements Experiment and on eighteen occasions for the Pressure Vessel Simulator Benchmark Experiment. (ERA citation 05:011914)

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A083 289/9 PC **A04**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
The Influence of Propellant Grain Geometry on Ignition-Induced, Two-Phase Flow Dynamics in Guns.
Memorandum rept.,
A. W. Horst, J. R. Kelso, J. J. Rocchio, and A. A. Koszoru. Feb 80, 70p ARBRL-MR-02989, AD-E430 392

Localized ignition of a bed of granular propellant can result in a substantial pressure gradient accompanying the convectively driven flame front. For the common example of base ignition of a moderately long, cylindrical, propellant charge, this wave front may, upon arrival at the projectile base, be reflected as a longitudinal pressure wave which can dissipate or grow to catastrophic levels. Previous studies investigated the use of 19-perforation grain designs as an alternate to the standard 7-perforation grain commonly employed. The larger size and reduced initial surface area of a ballistically equivalent 19-perforation charge were shown to reduce the level of pressure waves for a given igniter and charge configuration. This paper extends the scope of these studies to include the 37-perforation grain design. Both theoretical and experi-

mental studies suggest a significant potential for further reduction in the level of pressure waves, though the feasibility of a base-ignited, high-performance, artillery charge employing granular propellant was not demonstrated.

AD-A083 290/7 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Numerical Simulation of Hydrodynamic Ram.
Final rept.,
Kent D. Kimsey. Feb 80, 36p ARBRL-TR-02217, AD-E430 397

The EPIC-2 code has been used for the simulation of a kinetic energy projectile, with an L/D (length to diameter) ratio of 3, impacting at normal obliquity a cylindrical fuel cell simulator. A discussion of the predicted hydrodynamic ram event is presented along with a comparison with experimental data.

AD-A083 294/9 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Fuel-Air Explosions in a Fog Oil Smoke Environment.
Final rept.,
John D. Sullivan, and Richard G. Reitz. Jan 80, 33p ARBRL-MR-02985, AD-E430 393

A fuel-air explosion was investigated as a means of neutralizing a smoke screen of fog oil. On three runs a spray of propylene oxide was detonated inside a tactical fog cloud. The FAE did not ignite the fog oil cloud nor was any clearance evinced as judged by visual observation and camera and television recordings. Transmissometers with lines-of-sight through the clouds operated in the visible and three infrared bands. Immediately after detonation, the transmittance was reduced in all four spectra bands. The reduction in transmittance was probably a result of dust lofted by the FAE. It was concluded that tactical fog oil clouds are very probably too lean to ignite. There was no difficulty in detonating a fuel-air cloud in the covering fog oil cloud.

AD-A083 296/4 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Numerical Calculation of Three-Dimensional Displacement Effect on Bodies of Revolution.
Final rept.,
Robert P. Reklis. Feb 80, 25p ARBRL-MR-02993, AD-E430 402

Moore's differential equation for the three-dimensional displacement thickness is solved numerically for bodies of revolution. Comparison is made to a known analytic solution for the special case of a cone in supersonic flow. Results are presented for spinning and non-spinning artillery projectile shapes.

AD-A083 297/2 PC **A04**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Supersonic Wind Tunnel Measurements of Static and Magnus Aerodynamic Coefficients for Projectile Shapes with Tangent and Secant Ogive Noses.
Final rept.,
Charles J. Nietubicz, and Klaus O. Opalka. Feb 80, 73p ARBRL-MR-02991, AD-E430 401

Wind tunnel tests have been conducted for a series of projectile configurations. The shapes tested include a three caliber secant ogive nose and three caliber tangent ogive nose configuration. The overall model length was fixed at 6 calibers for all configurations tested. Static and Magnus aerodynamic coefficient data were obtained at Mach numbers 2.0, 3.0 and 4.0 for angles of attack up to 10.0 deg. The data are presented in graphical form along with tabulations of the summary data. The tangent ogive nose produced a slight increase in the Magnus moment coefficient when compared to similar secant ogive configurations. The boattail configuration, when compared to the cylinder shapes, was found to increase the Magnus moment; however, this effect was shown to decrease with increasing Mach number.

AD-A083 299/8 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Simplified Determination of Retardation for Kinetic Energy Projectiles.
Memorandum rept.,
William F. Donovan. Feb 80, 23p ARBRL-MR-02994, AD-E430 399

Correspondence between experimental and analytical determinations of retardation is demonstrated for a particular flight projectile. The predictive model requires only the projectile physical dimensions and mass and presumes a linear drag coefficient characteristic.

AD-A083 300/4 PC **A04**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
ESKIMO VI Model Tests.
Final rept.,
Charles N. Kingery. Feb 80, 61p ARBRL-TR-02215, AD-E430 385

This report contains the results from a series of high explosive tests designed to determine the blast loading from 1/50th scaled models of the type planned for exposure on operation ESKIMO VI. A 1.27 kg charge was used to simulate 158760 kg in a full size storage magazine. Blast loading on structures located to the front, side, and rear of a donor magazine are presented. Correlation with other model studies and full scale tests were made and predictions for the blast loading to be expected on the ESKIMO VI one-half scale structures are made.

AD-A083 417/6 Not available NTIS
Materials Research Labs Ascot Vale (Australia)
Penetration of Targets by Flat-Ended Projectiles,
R. L. Woodward, and M. E. de Morton. 15 Sep 75, 11p
Availability: Pub. in International Jnl. of Mechanical Science, v18 p119-127 1976 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 437/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Analytical Predictions of the Effect of Warhead Asymmetries on Shaped Charge Jets.
Final rept.,
Clifford L. Aseltine. Feb 80, 32p ARBRL-TR-02214, AD-E430 390

An analytical technique has been developed which allows the shaped charge designer to estimate the required tolerances in the final manufacturing of the device. Calculations are performed for liner, explosive, and confinement asymmetries which indicate that the rigid tolerances placed on the liner are indeed realistic. The present tolerances on explosive geometry and confinement geometry are also shown to be realistic. However, the results indicate that the explosive loading appears to be a problem in round to round variations. Less than a 2% variations in explosive composition will effect the jet more than a liner asymmetry at its maximum tolerance limit. Graphs, indicating transverse jet velocities as functions of liner position for various asymmetries are presented.

DOE/TIC-11117 PC **A02**/MF **A01**
Hercules, Inc., Cumberland, MD. Hercules Aerospace Div.
High Explosive Safety Manual. Fifth Quarterly Technical Progress Report, October-December 1979.
L. R. Albaugh, and D. A. McBride. Jan 80, 13p
Contract EP-78-C-01-6194

This is the fifth quarterly technical report on a program to prepare a high explosive safety manual for the Department of Energy. The program is described and progress to date is presented. During this work period, the first draft of the manual was completed and the quantitative risk analysis begun. (ERA citation 05:016418)

PB80-170855 PC **A03**/MF **A01**
Weapons Systems Research Lab., Adelaide (Australia).
Wind Tunnel Tests of a Spinning 105 mm Artillery Shell Model with Canard Control Surfaces.
Technical rept.,
C. Jermey. Sep 79, 48p AR-001-908, WSRL-0122-TR

Tests have been conducted to measure the aerodynamic characteristics of a spinning model of a 105 mm shell fitted with canard control surfaces. The tests covered an incidence range of -2 degrees to 15 degrees, a Mach number range of 0.70 to 0.95, and a control deflection range of zero to 30 degrees. The effectiveness of the canards as pitch and yaw controls and for generating maneuvering forces is discussed. The conclusion is reached that available maneuvering forces would be small, and an example is given for a typical trajectory in which a maximum shift of 90 m from the unguided impact point could be obtained.

19D. Explosions, Ballistics, and Armor

AD-A083 295/6 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Post-Shot Blast Loading Predictions for German Structure Number 2. Dice Throw Event.
Final rept.,
George A. Coulter. Mar 80, 25p ARBRL-MR-02996, AD-E430 403

Pressure-time blast loading post-shot predictions are presented for German Structure No. 2 exposed on the Dice Throw Event. Loading curves are shown for front, side and interior structure locations.

AD-A083 334/3 PC **A04**/MF **A01**
SRI International Menlo Park CA
Source Pressure and Flow Sample Measurements on DABS Tests S2 and S3.
Final rept. 14 Apr 77-30 Jun 78,
D. D. Keough, L. B. Hall, and R. W. Gates. 1 Jan 79, 68p DNA-4943F, AD-E300 728
Contract DNA001-77-C-0219

Air shock pressure-time histories were measured in the HE source region of the Air Force Weapons Laboratory (AFWL) DABS S2 test to determine source characteristics. Steel-ytterbium flatpack gages previously used for the measurement of soil stress were modified, and static, uniaxial strain calibration was performed at pressures to approximately 8 MPa. Results of static calibration at these low pressures and low strain rates agreed well with values extrapolated from high stress (500 MPa) uniaxial strain, shock data, indicating no strain rate effects in the ytterbium piezoresistance sensor and definable response if the tensor state of strain is carefully controlled. The gages survived the environment in the DABS test within 3 m of the HE source and indicated a double shock structure with peak pressures of up to 98 MPa, possible slight prepressurization of the source chamber by the primacord initiation system, less than 5% skewing of the air shock, and slightly higher pressures along the tube axis. Postshot measurement of the gage resistance showed that, for gages in which gross damage did not occur, the pre- and postshot values agreed within a few percent, indicating no gage hysteresis. Flow samplers consisting of steel tubes explosively closed at the ends during shock flow were fielded at two stations, 19 and 26 m on DABS S3 to determine the particulate matter concentration and for comparison of particulate matter arrival time with previously observed pressure variations.

AD-A083 346/7 PC **A05**/MF **A01**
Particle Measuring Systems Inc Boulder CO
Results of the Misers Bluff II Aircraft Dust Particle Sampling Experiments.
Final rept. 1 May 78-30 May 79,
Robert G. Knollenberg. 30 May 79, 87p DNA-4951F, AD-E300 712
Contract DNA001-78-C-0232

Dust clouds generated from two high explosive detonations of 100 and 600 tons (TNT equivalent)

in the Misers Bluff II Experiment were sampled with an instrumented aircraft to determine the size and number density of particulates from 0.1 to 10,000 micrometers. The primary sizing techniques utilized 'in situ' optical methodology. High resolution dust concentration measurements were performed from approximately T + 3 to T + 60 minutes during both experiments. The total mass lofted integrated from these samples was found to be 0.80 x 10 (to the 9th power) gm for the experiment pair. Typical mass loadings were a few tenths of a gram per cubic meter. Visibilities to less than 100 meters were encountered with single pass optical depths 10-45 in the well developed cloud regions. The largest dust particles observed were only about 2 mm diameter. Organic particles up to 10 mm long are widely dispersed with the dust particles. Mean mass sizes of 90-160 micrometers are typical. Turbulence was light at even the earliest passes. Aircraft damage was restricted to injected dirt creating small but measurable engine wear.

AD-A083 347/5 PC **A06/MF A01**
Weidlinger Associates New York
Preliminary Study of a Test Procedure for Obtaining Step Wave Loadings on Structures at Deep Submergence.
Topical rept. 1 Dec 78-30 Apr 79,
J. P. Wright, M. L. Baron, and F. L. DiMaggio. 30 Apr 79, 102p DNA-4933T, AD-E300 724
Contract DNA001-79-C-0078

This investigation is concerned with the development of a possible technique for obtaining step wave loading on deeply submerged structures. In this technique, a fluid-filled cylinder would be used as the test device and the cylinder itself submerged. A structural model would be placed inside the cylinder and the internal fluid brought to the required test pressure. A charge designed to produce a step wave would be placed in the water outside the test device. The shock wave from the charge would thus produce a loading in the pressurized cylinder and hence on the test mode. One of the first questions that arises is what is the form of the pressure wave that is produced within the cylinder. This report presents a preliminary study of this problem by considering the response of a submerged fluid-filled ring subjected to a transverse step wave. The external fluid is represented by using the plane wave approximation. The ring and internal fluid equations are replaced by finite difference approximations using central differences in space and time. Details of the numerical method, and the results of six calculations are given. In these six calculations, water is used as the internal and external fluids, and the ring which has the properties of either steel or aluminum, has two different radii and two or three different thicknesses. The primary reason for these calculaitons is to determine whether the ring is 'transparent'. That is, does the internal pressure time history look nearly the same as the external pressure.

AD-A083 436/6 PC **A06/MF A01**
Kaman Avidyne Burlington MA
Post-Test Blast Response Analyses of DICE THROW Vehicles.
Final rept. 26 Jul 77-1 Mar 78,
Kenneth R. Wetmore. Jan 80, 125p KA-TR-150, ARBRL-CR-00413, AD-E430 391
Contract DAAD05-74-C-0744

This report summarizes the results of a blast response study of select truck configurations fielded in the DICE THROW test. Using the TRUCK computer code, the response time-histories of four different Army wheeled vehicle systems exposed to both blast overpressure and dynamic pressure loadings were obtained. Important motions of the total systems subsequent to blast wave interception, particularly vehicle overturning, are plotted.

AD-A083 453/1 PC **A18/MF A01**
Merritt Cases Inc Redlands CA
Static Tests of Segments of Tunnel Linings. Volume II. Data.
Final rept. 14 Feb 77-30 Jun 79,
H. C. Davis, K. B. Morrill, and J. L. Merritt. 30 Jun 79, 413p 78-004-T1, DNA-4976F-2, AD-E300 721
Contract DNA001-77-C-0143

Volume II presents the complete set of laboratory data obtained from the initial series of 16 quasi-static tests of segments of cylindrical tunnel linings. Test specimens included scale models of two composite integral structures fielded in the MIGHTY EPIC Structures Experiment as well as two new structural concepts: the compliant liner and the voussoir block liner.

AD-A083 520/7 PC **A04/MF A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Lowthrm: A Thermal Fluence Code.
Master's thesis,
Chris R. Westbrook. Mar 80, 74p Rept no. AFIT/GNE/PH/80M-5

A Fortran computer program LOWTERM is described for calculating nuclear thermal fluence incident upon a target area. Atmospheric transmissivity factors in the spectral region 0.25 to 28.5 microns are determined through use of the LOWTRAN5 computer code. The program provides a choice of six model atmospheres covering seasonal and latitudinal variations from sea level to 100 km, eight haze models, and accounts for molecular absorption, molecular scattering, and aerosol extinction. Atmospheric refraction, earth curvature effects, thermal scattering, and thermal ground reflection contributions are included. (Author)

AD-A083 607/2 PC **A03/MF A01**
Goettingen Univ (Germany F R) Inst Fuer Physikalische Chemie
Influence of Various Parameters on Initiation, Stability, and Limits of Detonations.
Final rept. 1 Jun 78-31 May 79,
W. Jost, and H. Gg. Wagner. 31 Jul 79, 31p
AFOSR-TR-80-0306
Grant AFOSR-78-3587

Experiments on the influence of orifices on flame acceleration have been carried out with different hydrocarbon air mixtures in plexiglass ring metal tubes. Quantitative data could be obtained by pressure pickups and smear camera photographs. (Author)

AD-A083 624/7 PC **A03/MF A01**
Computer Code Consultants Inc Los Alamos NM
Three-Dimensional Hydrodynamic Code Study.
Final rept. 20 Jan 79-20 Feb 80,
Wallace E. Johnson. 20 Feb 80, 27p Rept no. CCC-BMD-F79
Contract DASG60-77-C-0095

A study of zone changes (thickness) indicated very small changes in peak pressure. A 2D calculation was performed for a coupling experiment. Quadrilateral zones rather than rectangular zones are required to accurately model curved surfaces. If the total impulse is the important factor to be calculated for structures, existing numerical codes and computers may be adequate to give trends, rather than absolute values. (Author)

PB80-174188 PC **A03/MF A01**
Bureau of Mines, Washington, DC.
Explosibility of Carbonsceous Dusts.
Report of investigations,
John Nagy, Henry G. Dorsett, Jr., and Austin R. Cooper. 1965, 33p BUMINES-RI-6597

Dust explosion data obtained in laboratory studies by the Bureau of Mines are presented for activated carbon, asphalt, charcoal, carbon black, coal, coke, gilsonite, graphite, lignite, miscellaneous carbons, pitch, tunnel dust, and mixtures of these materials with other ingredients. The explosion hazard is shown to increase as the volatile content of the dusts increases.

PB80-174196 PC **A03/MF A01**
Bureau of Mines, Washington, DC.
Explosibility of Metal Powders.
Report of investigations,
Murray Jacobson, Austin R. Cooper, and John Nagy. 1965, 29p BUMINES-RI-6516

Data obtained in the Bureau's study of dust explosions of 313 elemental metals, alloys, catalysts, and ores comprising 54 types of material are summarized. Information is given on ignition temperature, spark energy for ignition, minimum explosion concentration, explosion pressure, rate of pressure rise, and in some instances, the admixed inert dust and oxygen concentration in an atmosphere required to prevent ignition of dust dispersions. The effects of particle diameter on explosibility and pyrophoricity are also discussed.

UCRL-52845 PC **A03/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
Determination of the Pipe Stemming Load.
S. C. Cowin. 19 Oct 79, 32p
Contract W-7405-ENG-48

A mechanical model for the emplacement pipe system is developed. The model is then employed to determine the force applied to the surface collar of the emplacement pipe, the pipe-stemming load, and the stress along the emplacement pipe as a function of stemming height. These results are presented as integrals and a method for their numerical integration is given. (ERA citation 05:014049)

19F. Guns

PB80-174204 PC **A03/MF A01**
General Accounting Office, Washington, DC. Logistics and Communications Div.
Army Needs to Improve Its Management and Inventory Control of Small Arms.
Report to the Congress.
24 Mar 80, 41p LCD-80-41

Because of their cost, vital role in defense missions, and vulnerability to theft, military small arms, such as the M2 machine gun, require careful management and control. GAO found that the Army has not established nor maintained accurate inventory information needed to effectively manage its M2 machine gun program. As a result, the Army cannot determine whether decisions on procurement, distribution, or disposal of M2s are appropriate. To illustrate, after GAO identified that M2s were available in the Army as well as in the Navy and Air Force inventories of which the Army was unaware, the Army cancelled a planned $10.2 million purchase of M2s.

19G. Rockets

AD-A083 498/6 PC **A04/MF A01**
Naval Weapons Center China Lake CA
Stress Analysis of the External Stores DP Ejection Launcher/Inner Tube Subsystem.
Technical memo.,
Anthony L. Freeman, Earl R. Hanblem, and Gale W. Paxton. Nov 78, 64p NWC-TM-3358, GIDEP-E140-2365

No abstract available.

20. PHYSICS

20A. Acoustics

AD-A083 053/9 Not available NTIS
McGill Univ Montreal (Quebec) Dept of Electrical Engineering
Acoustic Surface-Wave Scattering on a Homogeneous Three-Quarter Space,
M. Munasinghe, and G. W. Farnell. 9 Aug 72, 7p DRB-REPRINT-4043
Availability: Pub. in Jnl. of Applied Physics, v44 n5 p2025-2031 May 73 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 056/2 Not available NTIS
McGill Univ Montreal (Quebec) Dept of Electrical Engineering
Propagation of Acoustic Surface Waves in Multilayers: A Matrix Description,
A. H. Fahmy, and E. L. Adler. 30 Oct 72, 3p DRB-REPRINT-4038
Availability: Pub. in Applied Physics Letters, v22 n10 p495-497, 15 May 73 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 075/2 PC **A04/MF A01**
Wyle Labs El Segundo CA

Correction Procedures for Aircraft Noise Data. Volume IV. Tone Perception.
Final rept.,
D. N. May, and E. E. Watson. Feb 80, 75p WR-79-9-VOL-4, FAA/EE-80-1-VOL-4
Contract DOT-FA78WA-4143
See also Volume 1, AD-A082 011.

The existing tone correction procedure in the Effective Perceived Noise Level (EPNL) calculation procedure required for aircraft certification under Part 36 of the Federal Aviation Regulations was compared with other tone correction procedures, including the SAE Aerospace Recommended Practice 1071 and a multitone procedure due to Kryter and Pearsons. Different amounts of tone correction (level-weightings) and varying degrees of tone correction at different times in the flyover (time-weightings) were also explored. Also studied was a measure of spectral fluctuation, developed by NASA and known as spectral change. The research was limited to considering revisions within the framework of one-third octave, 0.5 second interval analysis, since such revisions can be quite easily implemented. The various tone correction noise metrics were tested against subjective judgements furnished by NASA of the noise from a range of propjet, turbojet, low and high bypass ratio turbofan, and supersonic commercial aircraft. It was found that a revision based on spectral change could, after further development, be a means to improve the accuracy of the EPNL metric. However, the success of the various other potential revisions depended on the characteristics of the data base tested. It was shown that research into improved metrics should be based on experimental plans which account for the correlations among the noise variables and the presence of any interactions. A separate, psychoacoustical pilot experiment was also performed into the effects of pseudotones on judged noisiness. (Pseudotones are low frequency tones introduced into a measured spectrum by ground reflections near the microphone).

AD-A083 127/1 PC **A07**/MF **A01**
Texas Univ At Austin Applied Research Labs
Summary of Recent Results in Acoustic Bottom Interaction.
Annual rept. 1 Jan-31 Dec 79,
Paul J. Vidmar, Steven R. Rutherford, and Kenneth E. Hawker. 19 Feb 80, 139p Rept no. ARL-TR-80-6
Contract N00014-78-C-0113

This report summarizes research carried out on acoustic interaction with the sea floor, Major topics considered are propagation in a range variable environment using mode-mode coupling methods and the effect of sediment rigidity on bottom reflection loss. Additional topics are the coherence of bottom interacting energy and the effects of bottom roughness (scattering).

AD-A083 320/2 PC **A09**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
True-Integrating Environmental Noise Monitor and Sound-Exposure Level Meter. Volume III. Microprocessor Program and Data Interface Description.
Final rept.,
A. J. Averbuch, and L. M. Little. Mar 80, 178p Rept no. CERL-TR-N-41-VOL-3
See also Volume 4, AD-A083 321.

This report describes the internal microprocessor program used to operate the U.S. Army Construction Engineering Research Laboratory (CERL) True-Integrating Environmental Noise Monitor and Sound-Exposure Level Meter. Several data interface accessories are also described; complete program listings are included. (Author)

AD-A083 484/6 PC **A03**/MF **A01**
Utah Univ Salt Lake City Dept of Mathematics
Transient Acoustic Wave Propagation in an Epstein Duct.
Technical summary rept.,
Calvin H. Wilcox. Nov 79, 50p Rept no. TR-36
Contract N00014-76-C-0276

Transient acoustic wave propagation is analyzed for the case of an unlimited plane-stratified fluid having constant density and sound speed c(y) at depth y given by the Epstein profile 1/c(y)-squared = K sech-squared (y/H) + L tanh (y/H) + M. The acoustic potential is a solution of the wave equation Dt-squared u - C-squared (y) (D1-squared u + D2-squared u + Dy-squared u) = f(t,x,y) where x = (x1,x2) are horizontal coordinates and f(t,x,y) characterizes the wave sources. The principal results of the analysis show that u is the sum of a free component, which behaves like a diverging spherical wave for large t, and a guided component which is approximately localized in a region abs. val. (y-y sub 0) < or = h and propagates outward in horizontal planes like a diverging cylindrical wave. (Author)

AD-A083 554/6 PC **A02**/MF **A01**
Naval Underwater Systems Center New London CT New London Lab
A Nearfield Model of the Parametric Radiator.
Technical memo.,
R. H. Mellen. 31 Dec 75, 19p Rept no. NUSC-TM-PA4-230-75
See also Part 2, AD-A083 555.

It is often necessary to measure and operate parametric radiators under conditions where finite range effects are important. A nearfield model is presented in which the source level is obtained by assuming the primary waves to be plane-cylindrical or diverging-conical depending upon whether the observation range is less or greater than the Rayleigh distance. Asymptotic beam patterns are obtained from the solution of an exponentially tapered line array. Nonlinear attenuation is not considered. (Author)

AD-A083 555/3 PC **A02**/MF **A01**
Naval Underwater Systems Center New London CT New London Lab
A Nearfield Model of the Parametric Radiator Part II. Saturated Source Levels.
Technical memo.,
R. H. Mellen. 17 May 76, 24p Rept no. NUSC-TM-PA4-53-76
See also Part 3, AD-A083 556.

In the nearfield model of the parametric radiator, source levels were obtained by assuming the primary wave to be plane-cylindrical or diverging-conical, depending on whether the observation range was less or greater than the Rayleigh distance. The two cases are now combined by means of the 'horn' model, which approximates primary wave diffraction for a piston source. Saturation effects are also incorporated by means of a nonlinear attenuation approximation. (Author)

AD-A083 556/1 PC **A02**/MF **A01**
Naval Underwater Systems Center New London CT New London Lab
A Nearfield Model of the Parametric Radiator. Part III. Convolution Method.
Technical memo.,
R. H. Mellen. 19 Oct 76, 9p Rept no. NUSC-TM-316-489-16
See also report dated 31 Dec 75, AD-A083 554.

The line array solution of Part I is used in convolution with the primary pattern to calculate the field of collimated and spherically diverging sources of arbitrary transverse distribution. (Author)

AD-A083 606/4 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution MA
Inhomogeneous Waves and the Plane-Wave Reflection Coefficient.
Technical rept.,
George V. Frisk. 31 Aug 78, 21p Rept nos. WHOI-79-100, WHOI-CONTRIB-4335
Contract N00014-77-C-0196
Pub. in Jnl. of the Acoustical Society of America, v66 n1 p219-234 Jul 79.

No abstract available.

AD-A083 616/3 PC **A03**/MF **A01**
Hughes Research Labs Malibu CA
Fiber Optic Delay Line (250 kHz - 250 MHz).
Final rept. 15 Mar-15 Sep 79,
C. W. Slayman, H. W. Yen, W. H. Wallace, and R. R. Burns. Mar 80, 50p
Contract N00173-79-C-0098

Three stabilized semiconductor laser transmitters, one photodiode-amplifier module, and one 475-m section of optical fiber were packaged for application in a fiber-optic delay line. The design and performance of the transmitter and receiver are presented over a bandwidth of 50 kHz to 350 MHz. The entire system, consisting of a transmitter-fiber-receiver, displays a dynamic range of 30 dB or better and a pulse delay of 2.2 microseconds. The system is flat to + or - 1 dB across the entire band. (Author)

N80-22053/6 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
Are Locally Reacting Acoustic Liners Always Behaving as They Should.
T. Zandbergen. 1 Sep 79, 8p NLR-MP-79002-U
Contract NIVR-1850
Presented at 5TH Aiaa AERO-Acoustic Conf., Seattle, 12-14 Mar. 1979.

The properties of a Helmholtz resonator type acoustic lining material may be seriously affected by intercellular water drain holes. This was shown by experiments on an actual aircraft engine liner where drain holes caused a considerable shift in the frequency for maximum attenuation. Futhermore the drain holes invalidate the assumption of local reaction which is usually made for this type of lining material in duct acoustics. This was confirmed by the phase differences measured between the signals of two microphones at the bottom wall of a cell of the material. In the absence of drain holes, such phase differences were also found when the free space acoustic wavelength was smaller than 3.5 times the cavity cross dimension. Some remarks are made concerning problems associated with the application of the two microphone technique for in situ impedance measurements on a rather large cell material.

20B. Crystallography

INIS-mf-4784 PC **A07**/MF **A01**
Technische Univ., Brunswick (Germany, F.R.). 1. Naturwissenschaftliche Fakultaet.
Determination of the Velocity of Dislocation Groups in Neutron Irradiated Copper Single Crystals.
Diss. (D.Sc.),
R. K. Rodloff. 1 Sep 76, 114p
In German.
U.S. Sales Only.

Using high frequency kinematographic methods we have investigated the formation of glide bands in the glow region of neutron irradiated central orientated copper single crystals at room temperature in the velocity range between 1.78 10 exp -3 mm/sec and 3.75 10 exp -2 mm/sec. A special analysis has been used to determine the velocity of the dislocations in normal line direction and the velocities vs and ve of the pure screw and step dislocations from the growth velocities of length (vsub(L)) and height (vsub(H)). The following values have been deduced: l = 1.78 10 exp -3 mm/sec: vsub(s) = 4.5 10 exp -2 mm/sec; vsub(e) = 1.0 10 exp -2 mm/sec; for: tauo= 2.3sub(o) = 2.35 kp/mm exp 2 ; l = 3.75 10 exp -2 mm/sec: vsub(s) = 2.5 10 exp -1 mm/sec; vsub(e) = 6.0 10 exp -2 mm/sec; for: tausub(o) = 2.83 kp/mm exp 2 . All experimental values correspond to dislocation groups of about 100 dislocations. (Atomindex citation 10:439021)

20C. Electricity and Magnetism

AD-A083 145/3 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
Polarizabilities of Rectangular Dielectric Cylinders and of a Cube,
Leonard Eyges, and Peter Gianino. 20 May 80, 5p Rept no. RADC/ETR-80-0010
Pub. in IEEE Transactions of Antennas and Propagation, vAP-27 n4 p557-560 Jul 79.

No abstract available.

JINR-R-2-9669 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Energy-Momentum Tensor of the Electrical Matter.
V. N. Strel'tsov. 1976, 5p

in Russian.
U.S. Sales Only.

The energy-momentum tensor of the electrical matter is introduced: S/sub ik/ = j/sub i/ A/sub k/ + A/sub i/ j/sub k/ -delta/ sub ik/ j/sub l/ A/ sub l/, where j/sub i/ is the four-current density and A/sub i/ is the four-vector potential of the electromagnetic field. It has been shown that the S/sub ik/ four-divergence is the Lorentz force density. (Atomindex citation 10:424178)

20D. Fluid Mechanics

AD-A083 153/7 PC **A02/MF A01**
Purdue Univ Lafayette IN Ray W Herrick Labs
Interface Crossing Frequency as a Self-Preserving Flow Variable in a Turbulent Plane Jet,
J. W. Oler, and Victor W. Goldschmidt. 31 Jul 78, 4p
Contract N00014-75-C-1048, Grant NSF-GK-19317A3
Pub. in Physics of Fluids, v23 n1 p19-21 Jan 80. Sponsored in part by Grant NSF-ENG74-20780.

No abstract available.

AD-A083 256/8 Not available NTIS
McGill Univ Montreal (Quebec) Dept of Mechanical Engineering
Dynamic Stability of Pipes Conveying Fluid,
M. P. Paidoussis, and N. T. Issid. 4 Aug 73, 29p DRB-REPRINT-4061
Availability: Pub. in Jnl. of Sound and Vibration, v33 n3 p267-294 1974 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 360/8 PC **A02/MF A01**
Foreign Technology Div Wright-Patterson AFB OH
Atomization of a Liquid by Spray Nozzles (Selected pages),
L. A. Vitman, B. D. Katsnel'son, and I. I. Paleyev. 3 May 79, 14p Rept no. FTD-ID(RS)T-0651-79
Edited trans. of mono. Raspylivaniye Zhidkosti Forsunkami, Moscow, Leningrad, 1962 p3-7, 263-264, by Charles T. Ostertag, Jr.

No abstract available.

EUR-5761 PC **A02/MF A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Numerical Method for Computing Partial Ionization in Gas Dynamics.
S. Garribba, and L. Quartapelle. 1977, 24p
U.S. Sales Only.

A procedure is described that for the first time allows efficient solution to the three equation of state of a partially (and singly) ionized neutral gas at thermodynamic equilibrium as required by the finite difference schemes of numerical fluid dynamics. This procedure is applicable to steady or unsteady multidimensional flows where nonuniform ionization plays a substantial role. The values of the intensive variables, that is, pressure, temperature, and ionization coefficient, are iteratively obtained with a given accuracy starting from assigned values of energy and volume per unit mass. Iterative computation is performed only when the value of the ionization coefficient is estimated within the lower and the upper bounds imposed by the required number of significant digits; otherwise the procedure employs the two explicit equations of state of a nonionized or fully ionized gas. The method has been applied to the study of partial ionization produced by the propagation of strong shock waves in one dimension. The simulation clearly shows the peaked shape of the density ratio vs. shock strength. (Atomindex citation 10:424239)

FRNC-TH-779 PC **A05/MF A01**
Toulouse-3 Univ. (France).
Propagation Study of the Ionization Fronts in a Gas Subject to an Impulse Field.
F. Gayraud. 1978, 100p
In French.Thesis.
U.S. Sales Only.

We study the formation of a discharge in nitrogen and in nitrogen-methane mixtures (2.5% to 50% of methane) for pressures of several hundred torr and for electric-field-to-pressure ratio values between 110 and 150 V.cm exp -1 .torr exp -1 . The development of the discharge is observed by means of streak camera with a temporal resolution of 400 ps. The analysis of the recording allows characterization of several phases in the ionization front development. We give the variation of the speed of the fronts as a function of the proportion of methane and of the ratio E/p. We describe a streamer propagation model, based on the hypothesis that the plasma channel behind the front is assimilable to a perfect conductor. Thus, we obtain analytic expressions of the length and the speed of the streamer. The values obtained from these relations are in excellent agreement with the values measured. (Atomindex citation 10:488809)

FRNC-TH-812 PC **A06/MF A01**
Toulouse-3 Univ. (France).
Shape of Argon Spectral Lines Emitted from an Electric Arc (P=760 Torr). Study and Application of Pressure Broadening.
D. Kretzas. 1978, 101p
In French.Thesis.
U.S. Sales Only.

We have studied the broadening and shift of argon spectral lines corresponding to 3p exp 5 5p-3p exp 5 4s and 3p exp 5 4p-3p exp 5 4s transitions emitted from an electric arc burning under atmospheric pressure. We have revealed the broadening due to the pressure effect of neutral atoms, distinguishing the transitions whose lower level is a metastable one (1s sub 3 and 1s sub 5) or a level of strong (1s sub 2) or feeble resonance (1s sub 4). In this study we have employed a mixture of argon (98%) and hydrogen (2%); hydrogen's feeble proportion does not perturb much the discharge and is very suitable for the measure of the electronic density. The important departure from L.T.E. has guided us to imagine and apply an original method to measure the temperature and the overpopulation of the neutral atoms in the fundamental state. Our method, which is independent of the existence of L.T.E., is based on the different behavior of the spectral lines which are under the influence of the resonance or Van der Waals broadening. The measure of the broadening constants, which in the resonance case are independent of the temperature and vary as T/sup 0.3/ for V.d.W's broadening, give us a suitable tool to measure the density and the temperature of the neutral atoms. (Atomindex citation 10:488857)

FRNC-TH-849 PC **A06/MF A01**
Toulouse-3 Univ. (France).
Study of the Spatial Variation of Macroscopic Quantities in a Weakly Ionized Gas.
S. Pareathumby. 1978, 104p
In French.Thesis.
U.S. Sales Only.

We devise a numerical method of solution to the Boltzmann equation for weakly ionized gases valid for high values of the ratio E/p (electric field upon gas pressure) and for any type of field. We apply the method to determine the transmission factor Tr of the electrons, and we study the influence of the angular distribution of the electrons at the cathode, of the gas pressure and the reflection coefficient upon Tr. We then determine for a steady field the spatial evolution of the energy distribution function of the electrons in the stationary state. We show the existence of a 'swinging effect' between high and low energy electrons due to the creation through ionization of slow electrons. We calculate the electronic density, the mean energy and the different rates of excitation and ionization, and we show how the walls of the system affect these values. We also show that, with the exception of the density, the macroscopic quantities reach steady values for a sufficiently high gap value. For the low E/p values we develop a general solution for the distribution function liable to account correctly for the wall effects. (Atomindex citation 10:488880)

INIS-mf-4311 PC **A05/MF A01**
Sao Paulo Univ., Sao Carlos (Brazil). Inst. de Fisica e Quimica.
Magnetic Properties of Confined Electron Gas.
J. R. D. de Felicio. Apr 77, 79p
In Portuguese.Thesis.
U.S. Sales Only.

The effects of confinement by a two or three-dimensional harmonic potential on the magnetic properties of a free electron gas are investigated using the grand-canonical ensemble framework. At high temperatures an extension of Darwin's, Felderhof and Raval's works is made taking into account spin effects at low temperature. A comprehensive description of the magnetic properties of a free electron gas is given. The system is regarded as finite, but the boundary condition psi=0 is not introduced. The limits of weak and strong confinement are also analysed. (Atomindex citation 09:387032)

INIS-mf-4312 PC **A04/MF A01**
Sao Paulo Univ., Sao Carlos (Brazil). Inst. de Fisica e Quimica.
Effects of a delta-Attractive Impurity in the Thermodynamics Properties of an One-Dimensional Ideal Bose Gas.
L. C. Ioriatti Junior. 1976, 53p
In Portuguese.Thesis.
U.S. Sales Only.

The thermodynamic behavior of the one-dimensional bose gas-attractive delta impurity system is studied. The system is shown to undergo the Bose-Einstein condensation and the cause of the phase transition is attributed to the bound state introduced by the impurity in the free particle energy spectrum. The condensed phase is composed by particles captured by the impurity, forming a drop of particles well localized in space. This gives to the Bose-Einstein condensation in this system the appearance of the ordinary vapor-liquid phase transition. The order of the phase transition is analized with the aid of the Clausius-Clayperon equation, leading to the conclusion that the transition is a first order one. This reinforces the interpretation of a vapor-liquid transition. The evaluation of the heat capacity at constant length shows the existence of a finite discontinuity at the transition temperature. (Atomindex citation 09:387055)

N80-21702/9 PC **A03/MF A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Velocity-Split Navier-Stokes Solution Procedure for Incompressible High Reynolds Number External Flows.
D. L. Dwoyer. Apr 80, 36p NASA-TP-1655, L-13343

A method for solving the Navier-Stokes equations based on splitting the velocity vector into its rotational and irrotational parts was sucessfully applied to internal flow computations. The applicability of the method to external flows is examined by studying several model problems. The model problems are those of laminar and turbulent incompressible flow past a semi-infinite flat plate and laminar incompressible flow past a finite flat plate. For these problems, the procedure accurately reproduces the known solutions and is computationally very efficient even at high Reynolds numbers. Computational aspects of the method are discussed along with the possibility of using the procedure to retrofit a viscous capability into existing potential flow codes.

PB80-810567 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Cavitation: Cavitation Flow. 1974-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1974-Apr 80,
Guy E. Habercom, Jr. May 80, 259p
Supersedes NTIS/PS-79/0327 and NTIS/PS-78/0258. See also 1964-1973, NTIS/PS-76/0163.

The bibliography includes reports on general aspects of cavitating flow. A wide range of theoretical, analytical, and experimental information is presented involving mathematical analysis, computer programs, and testing. Topics include marine engineering, hydrodynamic and aerodynamic configurations, symmetric and nonaxisymmetric shapes, and measuring technology. Data is given on surface piercing struts, helical inducers, pumps, liquid metal systems, and venturi tubes. Applications include dam outlets and spillways, vertical conduits, deep rock drilling, heat pipe stability, water entry, and liquid cryogenic systems. Discussions are

made of flow characteristics, noise, nucleate boiling, perturbation problems, and allied subjects. Cavitation related to turbines, propellers, rudders, cavities, and hydrofoils is not included. These topics, and materials on cavitation corrosion and erosion, are covered in other associated bibliographies. (This updated bibliography contains 253 abstracts, 17 of which are new entries to the previous edition.)

SAND-79-8062 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
Calculation of Skin-Friction Coefficients for Low-Reynolds-Number Turbulent Boundary Layer Flows.
P. K. Barr. Jan 80, 82p
Contract EY-76-C-04-0789

An analysis is presented of the reliability of various generally accepted empirical expressions for the prediction of the skin-friction coefficient C/sub f/ of turbulent boundary layers at low Reynolds numbers in zero-pressure-gradient flows on a smooth flat plate. The skin-friction coefficients predicted from these expressions were compared to the skin-friction coefficients of experimental profiles that were determined from a graphical method formulated from the law of the wall. These expressions are found to predict values that are consistently different than those obtained from the graphical method over the range 600 < Re/sub theta/ < 2000. A curve-fitted empirical relationship was developed from the present data and yields a better estimated value of C/sub f/ in this range. The data, covering the range 200 < Re/sub theta/ < 7000, provide insight into the nature of transitional flows. They show that fully developed turbulent boundary layers occur at Reynolds numbers Re/sub theta/ down to 425. Below this level there appears to be a well-ordered evolutionary process from the laminar to the turbulent profiles. These profiles clearly display the development of the turbulent core region and the shrinking of the laminar sublayer with increasing values of Re/sub theta/. (ERA citation 05:017011)

20E. Masers and Lasers

AD-A083 047/1 PC **A05**/MF **A01**
Mississippi Univ University Dept of Mechanical Engineering
An Investigation of Turbulent Mixing in the Chemical Laser Using Holographic Imagery.
Final rept. 1 Dec 75-30 Nov 79,
C. R. Wimberly. 31 Dec 79, 91p ARO-13224.1-E
Grant DAAG29-76-G-0044

An investigation was conducted to determine the mixing characteristics in Chemical laser systems using a holographic flow field diagnostic network. Cold flow simulation was done using a variety of nozzles in an effort to uncover the effects of geometry, flow conditions and gas mixture combinations on the mixing of high speed parallel jets. (Author)

AD-A083 062/0 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Gaseous Saturable Isolator for a High-Gain CO2 Amplifier Chain,
P. Lavigne, J. -L. Lachambre, and J. Gilbert. 9 Oct 75, 4p
Availability: Pub. in Applied Physics Letters, v28 n5 p265-267, 1 Mar 76 (No copies furnished by DTIC).

No abstract available.

AD-A083 063/8 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
A Purely Chemical HBr Laser,
S. J. Arnold, and K. D. Foster. 13 Jul 78, 3p
DRB-REPRINT-4220
Availability: Pub. in Applied Physics Letters, v33 n8 p716-717, 15 Oct 78 (No copies furnished by DTIC).

No abstract available.

AD-A083 105/7 PC **A02**/MF **A01**
Rochester Univ NY Dept of Physics and Astronomy
Photon Distributions of Lasers with First-Order Phase-Transition Analogies,
Rajarshi Roy. 8 Dec 78, 13p AFOSR-TR-80-0273
Grant AFOSR-76-2918
Pub. in Physics Review A, v20 n5 p2093-2104 Nov 79.

No abstract available.

AD-A083 106/5 PC **A02**/MF **A01**
Rochester Univ NY Dept of Physics and Astronomy
Mode Competition in a Homogeneously Broadened Ring Laser,
Surendra Singh, and L. Mandel. 21 Jun 79, 6p
AFOSR-TR-80-0270
Grant AFOSR-76-2918
Pub. in Physical Review A, v20 n6 p2459-2463 Dec 79.

No abstract available.

AD-A083 107/3 PC **A02**/MF **A01**
Illinois Univ At Urbana-Champaign Electro-Physics Lab
Hot-Band Lasing in NH3,
W. Lee, D. Kim, E. Malk, and J. Leap. 28 Mar 79, 4p AFOSR-TR-80-0272
Grant AFOSR-76-2988
Pub. in Ieee Jnl. of Quantum Electronics, vQE-15 n9 p838-839 Sep 79.

No abstract available.

AD-A083 222/0 PC **A08**/MF **A01**
Lockheed Missiles and Space Co Inc Huntsville AL Huntsville Research and Engineering Center
Plasma Chemistry Processes in the Closed Cycle EDL.
Final rept. 5 Jul 78-5 Jul 79,
Juergen Thoenes, and Shelby C. Kurzius. Jul 79, 161p LMSC-HREC-TR-D568999, DRCPM-HEL-CR-79-11-VOL-1
Contract DAAH40-78-C-0196
See also AD-A083 223.

Theoretical modeling of plasma chemistry effects on the performance of closed cycle, pulsed, electron beam sustained electric discharge lasers is described. The one-dimensional model considers the mutual interaction of the electron beam, the discharge, the plasma and laser radiation. The most important processes are modeled in terms of experimentally controllable parameters which include the post-foil electron beam current density, primary electron energy, applied electric potential, electrode spacing, initial gas composition, temperature and pressure, electron beam and discharge pulse width, and laser cavity characteristics. Results obtained for several laser gas mixtures are described and compared with experimental data. A detailed analysis has been made of test cases for closed cycle devices under development, including the effect on performance of variations in the electric field, the electron beam current, and the gas mixture composition. Electrophilic plasma by-products have been identified, and recommendations have been developed for experimental efforts to verify the predictions. (Author)

AD-A083 223/8 PC **A03**/MF **A01**
Lockheed Missiles and Space Co Inc Huntsville AL Huntsville Research and Engineering Center
EDLAMP User's Manual.
Technical rept.,
Juergen Thoenes. Jul 79, 37p LMSC-HREC-TR-D697555, DRCPM-HEL-CR-79-11-VOL-2
Contract DAAK40-78-C-0196
Supersedes Rept. no. DRDMI-H-CR-77-VOL-2.
See also AD-A083 222.

A computer program is described which can be used to analyze plasma chemistry effects on the performance of pulsed, electron-beam sustained, electric discharge lasers operating either in the open cycle or closed cycle mode. (Author)

AD-A083 230/3 PC **A04**/MF **A01**
United Technologies Research Center East Hartford CT
Novel Resonators for High Power Chemical Lasers.
Final letter rept.,
H. R. Garcia, G. E. Palma, A. W. Angelbeck, R. D. Quinnell, and J. B. Urquhart. 1979, 68p
Contract N00173-79-C-0410
Prepared in cooperation with Pratt and Whitney Aircraft, Government Products Div.

For the equivalent compacted ring resonator, beam injection can help maintain bare resonator power coupling at the unperturbed value. For small misalignments, injection improves bare beam quality, but it does not improve quality degradation due to astigmatism. For the annular ring resonator, beam injection maintains both bare resonator power coupling and beam quality at the unperturbed values for very small misalignments. And, as expected, this resonator is much more sensitive to misalignment than its equivalent compacted resonator. Additionally, the reverse wave analysis has shown the unstable ring/linear stable MO injection configuration to offer satisfactory reverse wave suppression. Based on bare resonator analyses injection locking shows promise. To determine its potential, loaded resonator analyses for high-power devices must be performed. mode discrimination, possible parasitics, sensitivity to misalignment,and scale-ability to high power are potential problems that need in-depth investigation. Additionally, the technical issues associated with cavity length equalization to less than lambda; matching of the MO and HEL spectra; and the stability, mode matching and power requirements for the MO need to be addressed experimentally so the real hardware requirements can be established.

AD-A083 255/0 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
A Transversely rf-Excited CO2 Waveguide Laser,
J. -L. Lachambre, J. Macfarlane, G. Otis, and P. Lavigne. 28 Dec 77, 3p DRB-REPRINT-4208
Availability: Pub. in Applied Physics Letters, v32 n10 p652-653, 15 May 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 419/2 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
A Compact, Sealed, Single Mode TEA CO2 Laser,
Paul Pace, and Marc LaCombe. 8 May 78, 6p
DRB-REPRINT-4219
Availability: Pub. in Optics Communications, v26 n3 p405-409 Sep 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 427/5 PC **A03**/MF **A01**
Joint Inst for Lab Astrophysics Boulder CO
Research in Laser Processes.
Semiannual rept. 1 Feb-31 Jul 79,
A. V. Phelps, and A. C. Gallagher. 15 Apr 80, 50p
Contract N00014-76-C-0123, ARPA Order-2683

A model has been completed of the NaXe discharges examined experimentally under this contract. This model includes the effects of electron excitation, deexcitation and ionization of excited Na atoms, as well as electron loss processes such as dissociative recombination with Na2(+). By adopting apparently reasonable rate coefficients and reaction end products we are able to satisfactorily reproduce the measured steady-state densities of excited Na atoms. However, a serious and unexplained discrepancy is found in the energy balance for these discharges. By extrapolating these results to high Na densities we find what appears to be a region of sufficient optical gain at 700 nm for laser oscillation. Such a laser would require a short excitation pulse (approx. 100 ns) and would have a low discharge impedance. A new technique has been developed for the measurement of electron excitation rate coefficients for the metastable states of the rare gases. A multipass absorption cell and a single mode dye laser allow measurement of metastable densities as low as 1,000,000 atom/cc. (Author)

AD-A083 457/2 Not available NTIS
National Research Council of Canada Ottawa (Ontario) Div of Physics

Absolute Frequency Measurements of N2O Laser Transitions,
B. G. Whitford, K. J. Siemsen, H. D. Riccius, and G. R. Hanes. 11 Feb 75, 5p Rept no. NRCC-14597
Availability: Pub. in Optics Communications, v14 n1 p70-74 May 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 591/8 PC **A02**/MF **A01**
Columbia Radiation Lab New York
Optical Pumping of Cesium Atoms with Second Resonance Light,
J. Liran, J. Pietras, J. Camparo, and W. Happer. 1 Aug 79, 6p AFOSR-TR-80-0288
Grants AFOSR-74-2685, NSF-ENG76-16424
Pub. in Optics Communications, v31 n2 p169-173 Nov 79.

No abstract available.

INIS-mf-4306 PC **A05**/MF **A01**
Max-Planck-Gesellschaft zer Foerderung der Wissenschaften e.V., Garching (Germany, F.R.). Projektgruppe fuer Laserforschung.
PLF Annual Report 1976.
1976, 92p
In German.
U.S. Sales Only.

After an introduction on organisation, tasks and development of the Project Group for Laser Research (PLF), the departments 'Laser plasmas and high-power laser development', 'Laser chemistry' and 'Laser spectroscopy' report on results and plans in connection with their subjects of research. A list of all publications during 1976 concludes the report. (Atomindex citation 09:390381)

N80-21735/9 PC **A03**/MF **A01**
RCA Labs., Princeton, NJ.
Study of LPE Methods for Growth of InGaAsP/InP CW Lasers.
Final Report, 3 Aug. 1978 - 2 Jul. 1979.
I. Ladany, F. Z. Hawrylo, R. T. Smith, and E. R. Levin. Apr 80, 47p NASA-CR-3268, PRRL-79-CR-40
Contract NAS1-15440

Two methods for liquid phase growth of InGaAsP/InP lasers were studied. Single phase growth, based on saturated melts and 5 C supercooling, was compared to two phase growth excess InP and 20 C nominal supercooling. Substrates cut on the (100) plane were used, and morphology in both cases was excellent and comparable to that obtainable in AlGaAs materials. A high degree of reproducibility was obtained in the materials grown by the two phased method, which is therefore presently preferred for the preparation of laser material. A refractive index step of 0.28 and an index n = 3.46 were obtained for In.81Ga.19As,5P5 lasing at 1.3 microns. Oxide-stripe lasers with typical room temperature cw threshold currents of 180 mA were obtained and some of them showed single mode behavior without lateral cavity modifications. COntinuous operation of 800 h at room temperature was obtained without noticeable degradation.

PB80-810419 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Radiation Damage of Laser Materials. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Brian Carrigan. May 80, 224p
Supersedes NTIS/PS-79/0514 and NTIS/PS-78/0516.

Laser beam damage to laser materials such as optical glass, glass fibers, alkali metal halides, metals, mirrors, optical coatings, dielectrics, semiconductors, and matrix materials is studied. The majority of these citations concern infrared laser damage to infrared optical materials. (This updated bibliography contains 217 abstracts, 10 of which are new entries to the previous edition.)

UCRL-82275 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Large Scale Copper Vapor Laser Computer Control System.
M. J. LaChapell, L. W. Spencer, and G. W. Coutts. 15 May 79, 18p CONF-791005-6
Contract W-7405-ENG-48
ISA national conference, Chicago, IL, USA, 22 Oct 1979.

High power pulse copper vapor laser systems consist of a master oscillator and numerous power amplifiers. Large systems used in laser isotope separation experiments require several automatic control systems. The rapid development of compact mini computers over the past several years has enabled the implementation of sophisticated computer controlled copper vapor laser systems. Present systems provide automatic time synchronization and input power stabilization. Future systems will incorporate semi-automatic start-up capabilities. (ERA citation 05:015030)

20F. Optics

AD-A083 061/2 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Diffracted Waves in the Shadow Boundary Region,
G. Otis, J. -L. Lachambre, J. W. Y. Lit, and P. Lavigne. 9 Aug 76, 4p
Availability: Pub. in Jnl. of the Optical Society of America, v67 n4 p551-553 Apr 77 (No copies furnished by DTIC).

No abstract available.

AD-A083 077/8 PC **A02**/MF **A01**
Scripps Institution of Oceanography La Jolla CA Visability Lab
Transient Response and Huygen-Fresnel.
Final rept. 1 Jul-30 Sep 78,
James L. Harris, Sr. Jan 80, 23p Rept no. SIO-REF-80-2
Contract N00014-78-C-0576

The Huygen-Fresnel formulation for analysis of the propagation of an electromagnetic wavefront is extended from the monochromatic, steady state condition to the transient condition. The propagation of a plane wave and the transient response of a simple lens are analyzed to illustrate the application of the technique and to show that the results are consistent with those expected from the more familiar steady state formulations. (Author)

AD-A083 104/0 PC **A02**/MF **A01**
Rochester Univ NY Dept of Physics and Astronomy
Analytic Solutions of the Optical Bistability Equations for a Standing Wave Cavity,
Rajarshi Roy, and M. S. Zubairy. 16 Jul 79, 7p AFOSR-TR-80-0268
Grant AFOSR-76-2918
Pub. in Optics Communications, v32 n1 p163-168 Jan 80.

No abstract available.

AD-A083 108/1 PC **A02**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab
Orthogonality Properties of Optical Resonator Eigenmodes,
A. E. Siegman. 12 Sep 79, 6p GL-3038, AFOSR-TR-80-0271
Contract F49620-77-C-0092
Pub. in Optics Communications, v31 n3 p369-373 Dec 79.

No abstract available.

AD-A083 253/5 Not available NTIS
Alberta Univ Edmonton Dept of Electrical Engineering
Laser Gain Profiling with Uniform-Field Electrodes,
A. M. Robinson. 7 Jul 75, 6p
Availability: Pub. in Jnl. of Applied Physics, v47 n2 p608-613 Feb 76 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 286/5 PC **A04**/MF **A01**
Hughes Aircraft Co Culver City CA
Techniques for Fabricating High Resolution Liquid Crystal Reticles.
Interim technical rept. Oct 78-Sep 79,
Barry C. Gilbert. Dec 79, 54p Rept nos. HAC-FR-80-72-505, HAC-REF-E1635
Contract DAAK10-78-C-0386

The overall objective of this two-phase program was to develop techniques for fabricating high resolution liquid crystal reticles suitable for military application. The first phase of this program consisted of three technology development tasks, namely substrate improvements, liquid crystal seals, and electronics seals. The goal of each development task was successfully accomplished. Results are summarized below: (1) Techniques were developed to produce 98 percent working electrode lines without repair (100 percent with repair) on LCR plates with a density of 580 lines per inch. Results were verified by optical inspection and electrical test. (2) LC cells fabricated with Ablefilm 539 sealant have now surpassed 7000 hours at +80 C and -17 C without cell deterioration. Additional cells with bulk electrodes and continuous AC voltage have surpassed 6200 hours at +25 C without alignment change. Other cells fabricated with Ablefilm 539 showed no signs of weakening when exposed to liquid nitrogen or boiling water conditions. (3) A dual coating of silicon nitride and parylene demonstrated moisture protection, but the process was costly to apply and difficult to repair. Conventional hybrid solder sealing technology was used to devise two alternate packaging concepts to maximize producibility and maintainability with potentially lower production costs. (Author)

AD-A083 396/2 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Energy Conservation for Reflectivity and Transmissivity at a Very Rough Surface,
L. Tsang, and J. A. Kong. 4 Jun 79, 9p
Contract DAAG29-78-C-0020
Pub. in Jnl. of Applied Physics, v51 n1 p673-680 Jan 80.

No abstract available.

AD-A083 398/8 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Asymptotic Solution for the Reflectivity of a Very Rough Surface,
L. Tsang, and J. A. Kong. 4 Jun 79, 11p
Contract DAAG29-78-C-0020
Pub. in Jnl. of Applied Physics, v51 n1 p681-690 1980.

No abstract available.

AD-A083 400/2 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Diffraction of Optical Beams with Arbitrary Profiles by a Periodically Modulated Layer,
R. S. Chu, and J. A. Kong. 28 Apr 79, 7p
Contract DAAG29-78-C-0020
Pub. in Jnl. of Optical Society of America, v70 n1 p1-6 Jan 80.

No abstract available.

AD-A083 420/0 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Application of the Boundary-Diffraction-Wave Theory to Gaussian Beams,
Gabriel Otis. 31 Jan 74, 7p DRB-REPRINT-4069
Availability: Pub. in Jnl. of the Optical Society of America, v64 n11 p1545-1550 Nov 74 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 421/8 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Edge-On Diffraction of a Gaussian Laser Beam by a Semi-Infinite Plane,
G. Otis, and J. W. Y. Lit. 4 Dec 74, 6p DRB-REPRINT-4121
Availability: Pub. in Applied Optics, v14 n5 p1156-1160 May 75 (No copies furnisehd by DTIC/NTIS).

No abstract available.

PATENT-4 161 351
Not available NTIS
Department of Energy, Washington, DC.
All-Reflective Optical Target Illumination System with High Numerical Aperture.
Patent,
C. E. Thomas, R. D. Sigler, and J. G. Hoeger.
Filed 7 May 76, patented 17 Jul 79, 6p PAT-APPL-684 095
Supersedes PAT-APPL-684 095-76.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An all-reflective optical system is described for providing illumination of a target focal region at high numerical aperture from a pair of confluent collimated light beams. The collimated beams are each incident upon an associated concave eccentric pupil paraboloidal reflective surface. Each beam is focused through an opening in an associated outer ellipsoidal reflective surface onto a plane reflector. Each beam is reflected by its associated plane reflector onto the opposing concave surface of the outer ellipsoids to be focused through an opening in the plane surface onto an opposing inner concave ellipsoidal reflective surface, and thence onto the target region. 10 claims. (ERA citation 05:021117)

20G. Particle Accelerators

ANL-HEP-PR-79-44 PC **A02**/MF **A01**
Argonne National Lab., IL.
Survey of Eight-Magnet Spin Precession Snakes.
D. G. Underwood. 28 Nov 79, 23p
Contract W-31-109-ENG-38

A computer search was done to find new configurations for spin precession snakes. The transformation of proton polarization from S direction to either N or L direction within some constraints on magnet and beam properties was used as the basis of the search. The many new solutions found should be useful for external polarized beams and possibly in accelerators. (ERA citation 05:016379)

INIS-mf-4086 PC **A02**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
X-Ray Diffraction Using Synchrotron Radiation.
C. J. Howard. 1977, 15p
U.S. Sales Only.

The electron synchrotron produces radiation which is very intense, highly collimated, and polarised to a high degree. The spectrum is continuous and contains wavelengths in the range 0.01 nm to 10 mu m. There are two main approaches to the utilisation of the x-ray wavelengths in diffraction experiments. In one approach, a single wavelength is selected with a crystal monochromator and the diffraction of this wavelength by the specimen is examined by conventional means. In the other approach, simultaneous use is made of all the x-ray wavelengths in the beam and the diffraction of the different wavelengths is studied at fixed diffraction angles. Some results obtained by the second 'energy-dispersive' method are presented. (Atomindex citation 09:361927)

LA-7896 PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
General-Purpose Microprocessor-Based Control Chassis.
J. K. Halbig, S. F. Klosterbuer, and D. A. Swenson. Dec 79, 58p
Contract W-7405-ENG-36

The objective of the Pion Generation for Medical Irradiations (PIGMI) program at the Los Alamos Scientific Laboratory is to develop the technology to build smaller, less expensive, and more reliable proton linear accelerators for medical applications. For this program, a powerful, simple, inexpensive, and reliable control and data acquisition system was developed. The system has a NOVA 3D computer with a real time disk-operating system (RDOS) that communicates with distributed microprocessor-based controllers which directly control data input/output chassis. At the heart of the controller is a microprocessor crate which was conceived at the Fermi National Accelerator Laboratory. This idea was applied to the design of the hardware and software of the controller. (ERA citation 05:016383)

ORNL/SUB-33200/1 PC **A05**/MF **A01**
Hughes Aircraft Co., Torrance, CA. Electron Dynamics Div.
Development Program for a 200 KW, CW, 110 GHz Gyrotron. Quarterly Report No. 1, June-September 1979.
K. W. Arnold, J. J. Tancredi, M. Caplan, K. W. Ha, and D. N. Birnbaum. 1979, 87p
Contract W-7405-ENG-26

The objective of this program is the design and development of a millimeter-wave device to produce 200 kW of continuous-wave power at 110 GHz. The device, which will be a gyrotron oscillator, will be compatible with power delivery to an electron-cyclotron plasma. Smooth control of rf power output over a 17 dB range is required, and the device should be capable of operation into a severe time-varying rf load mismatch. Progress toward this goal is described and specifications of the gyrotron are given. (ERA citation 05:016386)

SLAC-PUB-2440 PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
Personnel Hazards from Medical Electron Accelerator Photoneutrons.
R. C. McCall, T. M. Jenkins, R. A. Shore, and P. D. LaRiviere. Dec 79, 4p CONF-800304-3
Contract EY-76-C-03-0515
International congress of the International Radiation Protection Association, Jerusalem, Israel, 8 Mar 1980.

For medical accelerators, neutron penetration through the room entry door is the major personnel hazard. Most therapy accelerator rooms are designed with at least a rudimentary maze to avoid the use of massive doors. Often, however, the maze may be similar to those shown in scale outline drawings of some medical electron accelerator rooms where the authors have made neutron measurements outside the doors which were of different thicknesses and compositions. The results are tabulated. It should be noted that there can be significant dose equivalents (H) at the door when a maze is inadequate, and that all three components - fast neutron, thermal neutron, and neutron capture gamma rays - can be equally important. (ERA citation 05:016387)

UCRL-Trans-11545 PC **A02**/MF **A01**
Akademiya Nauk SSSR, Novosibirsk. Inst. Yadernoi Fiziki.
Surface-Plasma Source with Discharge Without Closed Electron Drift: The Semiplanotron.
Yu. I. Bel'chenko, and G. V. Dudnikov. Dec 79, 17p
Contract W-7405-ENG-48
C IYaF--78-95.

The production of negative hydrogen and deuterium ions from surface-plasma sources with a rectilinear emission slit in which a discharge with electron drift in crossed fields is localized near the emission slit by means of a special configuration of electrodes that chops the closed drift is considered. (ERA citation 05:016372)

20H. Particle Physics

AERE-R-8870 PC **A04**/MF **A01**
UKAEA, Harwell (England). Atomic Energy Research Establishment.
User Guide to GASP - a General Purpose Program for Analysis and Manipulation of gamma Ray Spectra.
L. Salmon, and D. V. Booker. Jun 78, 55p
U.S. Sales Only.

The application of a very flexible computer program for the analysis of gamma-ray spectra at Harwell is described at a level suitable for users with practical experience of spectrometry but with limited knowledge of computer methods. Details of running a job are provided in this guide together with a description of the GASP language. The program is designed to allow free format input of data and instructions with the minimum requirements for running a task on the computer. A procedure called GASP can be invoked together with essential parameters which are described. The program itself is centred around the linear regression analysis of spectra produced from either sodium iodide crystals or solid state detectors with anything from 128 to 2048 channels. Various factors which are required for interpreting results (such as decay times, half lives, cross-section, chemical yield) can be entered and applied automatically, thus removing much tedious arithmetical labour. Many facilities have been added which include storage space (either internally to the program or on disk) which may be required for standard spectra and data to describe them. Various other processes which may be applied in gamma-ray spectrometry which include energy calibration, analysis of peaks, and searching for peaks in spectra from solid state detectors are described. A comprehensive list of the 'GASP' vocabulary which is used to present data and instructions to the program is included, together with examples of a number of specific applications. (Atomindex citation 10:422862)

ANL/NDM-45 PC **A05**/MF **A01**
Argonne National Lab., IL.
Evaluation of exp 235 U(N,F) Between 100 KeV and 20 MeV.
W. P. Poenitz. Jul 79, 86p
Contract W-31-109-ENG-38

The exp 235 U(n,f) cross section is evaluated in the energy range from 100 keV to 20 MeV. Experimental data are included up to the 1978 Harwell Conference on Neutron Physics. The evaluation methodology is discussed in detail. The shape and the normalization of the cross section are evaluated in separate steps. An extensive comparison of the evaluation result with experimental data sets is made. The shape of the cross section obtained in a preliminary version of the present evaluation and a normalization factor extracted from data provided within the framework of this evaluation were used by the Subcommittee on Standards and Normalizations of the Cross Sections Evaluation Working Group to establish exp 235 U(n,f) for ENDF/B-V above 100 keV. 20 figures, 6 tables. (ERA citation 05:014509)

ANU-P-714 PC **A02**/MF **A01**
Australian National Univ., Canberra. Research School of Physical Sciences.
Behaviour of the Moment of Inertia Curve in a Recrossing of the Ground State Band and the Super Band in exp 158 Er.
G. D. Dracoulis. Nov 78, 11p
U.S. Sales Only.

The recrossing of the ground state band with the super band as an explanation for the second anomaly in exp 158 Er is examined in terms of the moment of inertia. A two band mixing calculation does not reproduce the experimenal moment of inertia curve. (Atomindex citation 10:475717)

ANU-P-725 PC **A02**/MF **A01**
Australian National Univ., Canberra. Research School of Physical Sciences.
Resonance Strength of the 1175 KeV Resonance in exp 6 Li(Alpha , gamma) exp 10 B.
R. H. Spear, Z. E. Switkowski, D. L. Kennedy, and J. C. P. Heggie. Nov 78, 17p
U.S. Sales Only.

The resonance strength of the 1175-keV resonance in exp 6 Li (alpha , gamma) exp 10 B has been remeasured using a Ge(Li) detector. The result obtained is 0.40 +- 0.06 eV. This is in good agreement with previous measurements using NaI(T) detectors, provided that the earlier results are multiplied by the factor 6/10 to convert them to the centre-of-mass system. Some of the consequences which arise from the failure of previous workers to make this correction before evaluating the significance of their results are discussed. (Atomindex citation 10:475847)

ANU-P-730 PC **A02**/MF **A01**
Australian National Univ., Canberra. Research School of Physical Sciences.
Three-Quasiparticle Isomers and Rotational Bands in exp 171 Hf and exp 173 Hf.
G. D. Dracoulis, P. M. Walker, and K. F. Yee. Nov 78, 10p

U.S. Sales Only.

Low lying 3-quasiparticle isomers have been identified in exp 171 Hf and exp 173 Hf. Their energies, spins and parities 23/2 exp - and 19/2 exp + , and decay modes allow their characterisation as the coupling of a 7/2 exp + (633) neutron to the known 8 exp - and 6 exp + 2-quasiproton isomers of the core nuclei. The rotational band based on the 23/2 exp - isomer in exp 171 Hf has a moment of inertia similar to that of the 7/2 exp + (633) 1-quasineutron band, indicating rotation alignment in the 3-quasiparticle band. (Atomindex citation 10:475718)

CNRS-CPT-78-P-1027 PC **A02/MF A01**
Centre National de la Recherche Scientifique, Marseille (France). Centre de Physique Theorique.
Pure Classical SU(2) Yang-Mills Theory with Potentials Invariant under a U(1) Gauge Subgroup.
H. Bacry, and J. Nuyts. Jul 78, 23p
U.S. Sales Only.

The present article is devoted to pure SU(2) classical Yang-Mills theories whose potentials are invariant under a U(1) gauge subgroup. Such potentials are shown to be associated with classical Maxwell-like fields with magnetic sources as 't Hooft's monopole is associated with the Dirac magnetic monopole. Conversely, the authors give Yang-Mills potentials corresponding to some Maxwell-like fields, in particular static magnetic fields with emphasis on those with cylindrical symmetry (including the dipole and other multipoles) and the ephemerons corresponding to an instantaneous magnetic multipole. (Atomindex citation 10:488541)

CONF-790642-(V.1) PC **A21/MF A01**
European Organization for Nuclear Research, Geneva (Switzerland).
International Conference on High-Energy Physics. Volume 1. Sessions I to III.
1979, 482p
International conference on high energy physics, Geneva, Switzerland, 27 Jun 1979.
U.S. Sales Only.

Volume 1 of the conference proceedings contains sessions on neutrino physics and weak interactions, e exp + e exp - physics, and theory. Five of the papers have already been cited in ERA, and can be found by reference to the entry CONF-790642-- in the Report Number Index. The remaining 30 will be processed as they are received on the Atomindex tape. (ERA citation 05:017013)

COO-1195-446 PC **A05/MF A01**
Illinois Univ. at Urbana-Champaign.
Observation of Quasi Two-Body Production in Pion Plus Proton Goes to Neutron Plus Four Charged Pions at 8 GeV/C.
W. T. Wroblicka. 1980, 76p
Contract EY-76-C-02-1195

The first observation of quasi 2-body production in the backward reaction pi exp - p implies n pi exp + pi exp + pi exp - pi exp - is reported. Data were obtained with an 8-GeV/c pion beam incident on a liquid hydrogen target inside the University of Illinois/Argonne National Laboratory streamer chamber. The chamber was triggered by the interaction of a fast, forward neutral hadron in thick-plate optical spark chambers. Total backward cross sections were derived for the processes pi exp - p implies N* exp 0 (1520) + rho exp 0 /f exp 0 , N* exp 0 (1670) + rho exp 0 /f exp 0 , delta exp 0 (1890) + rho exp 0 /f exp 0 , and delta exp - (1236) + A sub 2+ . Evidence for a narrow A sub 1+ resonance was not seen. Corrections for losses due to finite acceptance were made by Monte Carlo techniques based on a simple baryon exchange model. Comparison is made to another experiment regarding the energy dependence of certain cross sections, and a simple power law behavior is observed. 16 figures, 8 tables. (ERA citation 05:014470)

COO-1428-462 PC **A02/MF A01**
Purdue Univ., Lafayette, IN. Dept. of Physics.
Experimental Test of Pion Exchange and PCAC in Proton-Nucleus Charge Exchange Reactions at 144 MeV.
G. L. Moake, P. T. Debevec, L. J. Gutay, P. A. Quin, and R. P. Scharenberg. 1979, 12p
Contract EY-76-C-02-1428

The differential cross sections of the (p,n) reaction on exp 6 Li, exp 12 C, and exp 14 N to the ground state of the final nuclei were measured at E/sub p/ = 144 and 0 < theta/sub LAB/ < 20 exp 0 . The quantum numbers of these transitions, like those in Gamow-Teller beta decay, have delta J = 1, delta T = 1, and delta P = 0, which is consistent with the one-pion exchange mechanism. Differential cross sections were calculated with the absorption modified one-pion exchange model. The nucleus was treated as an elementary particle, as first suggested by Kim and Primakoff. By use of the Partially Conserved Axial Vector Current Hypothesis (PCAC) the magnitude and momentum dependence of the initial nucleus-pion-final nucleus coupling constant, g/sub N pi N'/, was obtained from beta decay and inelastic electron scattering, respectively. The calculations, which had no free parameters, were found to agree with the data for exp 6 Li and exp 12 C, but not for exp 14 N. 3 figures, 1 table. (ERA citation 05:014483)

COO-1545-265(Rev.) PC **A02/MF A01**
Ohio State Univ., Columbus. Dept. of Physics.
Mixing Angles and CP Violation in SU(2)/sub L/ X U(1) Gauge Model.
S. Nandi, and K. Tanaka. 1979, 7p
Contract EY-76-C-02-1545

Expressions for the mixing parameters are obtained in terms of mass ratios in the standard Weinberg-Salam model with permutation symmetry S sub 3 for six quarks. The CP-violating phase, delta, is taken into account, and there are no arbitrary parameters except for the quark masses. In the lowest order, the angles defined by Kobayashi-Maskawa are sin theta sub 1 approx. = (m/sub d//m sub d/ + m/sub s/)/sup 1/2, sin theta sub 2 approx. = -((m/sub s//m/sub b/) exp 2 - (m/sub c//m/sub t/) exp 2)/sup 1/2/, and sin theta sub 3 = (m/sub s//m/sub b/) exp 2 /cos theta sub 1 . The model can be consistent with the observed magnitude of CP violation. The b quarks decay predominantly into c quarks with lifetime of tau/sub b/ approx. = 10 exp -11 s. (ERA citation 05:014475)

COO-1545-269 PC **A02/MF A01**
Stanford Univ., CA.
Polarization Asymmetries in E exp + E exp - Inclusive Hadron Production.
I. A. Schmidt, and W. W. Wada. Nov 79, 11p
Contracts EY-76-C-03-0515, EY-76-C-02-1545

Interference effects between electromagnetic and weak interactions in e exp + e exp - hadronic production, which are free from higher order QED corrections, are considered. In particular the asymmetry between the cross sections is calculated when one of the beams is longitudinally polarized positively and negatively, the other unpolarized. This asymmetry is then parity non-conserving. Numerical results are given for total hadronic cross sections, and for pi , K exp -+ , D exp -+ inclusive production. (ERA citation 05:014463)

COO-3274-23 PC **A04/MF A01**
Johns Hopkins Univ., Baltimore, MD.
Nuclear Moments and Nuclear Structure. Annual Progress Report, August 1, 1978-July, 31, 1979.
L. Madansky, and Y. K. Lee. 1979, 51p
Contract EY-76-S-02-3274

This report reviews activities for the period from August 1, 1978 through July 31, 1979. Four experiment reports and a list of publications are included. Separate abstracts were prepared for unpublished data. (ERA citation 05:017096)

DESY-79/18 PC **A02/MF A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
QCD Scattering Processes with Hard Gluon Emission.
E. Pietarinen, and Z. Kunszt. Mar 79, 17p
U.S. Sales Only.

2 implies 3 QCD scattering processes are studied in kinematical regions which are free from infrared and mass singularities. Anomalously large hard gluon emission corrections are found to gluon-gluon annihilation gg implies q anti q. It is pointed out that in a kinematical region where azimuthal angle correlations of large transverse momentum pi exp 0 's have been measured at ISR, the 3-jet production rate is large and the contribution of the subprocess gq implies ggq is greater than the contributions from quark-quark scattering qq implies qqg. (Atomindex citation 10:475621)

DESY-79/19 PC **A02/MF A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Measurement of Leptonic Branching Ratios of the UPSILON(9.46).
C. Berger, W. Lackas, F. Raupach, W. Wagner, and G. Alexander. Mar 79, 15p
U.S. Sales Only.

The electron width GAMMAee = (1.33 +- 0.14) keV and B mu mu = GAMMA mu mu /GAMMAtot of the UPSILON(9.46) have been measured as GAMMAee = (1.33 +- 0.14) keV and B mu mu = (2.2 +- 2.0)%. From these values a lower limit of GAMMAtot > 23 keV for the total width of the UPSILON(9.46) is obtained. (Atomindex citation 10:475653)

DESY-79/20 PC **A04/MF A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Quarkonia.
M. Krammer, and H. Krasemann. Apr 79, 61p
U.S. Sales Only.

The topics of this lecture are as follows: the spectra of quarkonium, level splittings, photon transitions and sum rules, the electro- and chromomagnetic annihilation and jets from quarkonia. (Atomindex citation 10:475599)

DESY-79/22 PC **A02/MF A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Z Sub 2 Monopoles in the Standard SU(2) Lattice Gauge Theory Model.
G. Mack, and V. B. Petkova. Apr 79, 22p
U.S. Sales Only.

The standard SU(2) lattice gauge theory model without fermions may be considered as a Z sub 2 model with monopoles and fluctuating coupling constants. At low temperatures beta exp -1 (= small bare coupling constant) the monopoles are confined. (Atomindex citation 10:475608)

DESY-79/24 PC **A02/MF A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Observation of an Excess of Events in E exp + E exp - Annihilations into Neutral Final-States Leading to Three Electromagnetic Showers at 10 GeV.
U. Glawe, F. H. Heimlich, P. Lezoch, U. Strohbusch, and J. K. Bienlein. Apr 79, 7p
U.S. Sales Only.

During the UPSILON investigation at DORIS, we observed six events in the e exp + e exp - annihilation into three electromagnetic showers in a particular kinematical configuration where QED predicted 1.0 +- 0.4 events for the three-photon final-state. The excess events were not related to the UPSILON resonance. A cross-section of approximately 70 pb has been determined. (Atomindex citation 10:475672)

DESY-79/25 PC **A03/MF A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Equation of Motion for String Operators in Quantum Chromodynamics.
H. Suura. Apr 79, 27p
U.S. Sales Only.

I derive from the QCD Lagrangian differential laws describing motions and interactions of an infinite set of string operators - locally gauge-invariant color-singlet operators. By truncating the set, I obtain a q-anti q wave equation with a confinement potential, and also a jet-fragmentation equation which describes splitting of a q-anti q string and creation of I = O vector mesons. I argue for the validity of the perturbative treatment of the string operators. (Atomindex citation 10:475633)

EFI-281(6)-78 PC **A02/MF A01**
Erevanskii Fizicheskii Inst. (USSR).

Remarks on the X(2.85) Production in the Charge Exchange Reaction.
A. Yu. Khodiamiryan. 1978, 8p
U.S. Sales Only.

The comparison is made between recent experimental data on the X(2.85)-meson production in the pi exp - p implies Xn reaction and the expected features of X meson in the charmonium model. It is shown that the A sub 2 -exchange cannot account for more than 0.1% of the measured X-production cross section. (Atomindex citation 10:475593)

EFI-284(9)-78 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Rho (Omega) Implies pi gamma Decays and Anomalous Magnetic Moment of Quarks.
I. G. Aznauryan, and N. L. Ter-Isaakyan. 1978, 8p
U.S. Sales Only.

The rho implies pi gamma and omega implies pi gamma decays are considered in the framework of the two-quark model for mesons. It is assumed that the presence of a unitary-singlet part in the quark anomalous magnetic moment is at nearly 10% level of the normal magnetic moment. It is shown that one can eliminate the discrepancy between the predictions of quark models and experiment as regards the ratio of rho(omega) implies pi gamma decays without breaking the assumption on the two-quark structure of mesons. (Atomindex citation 10:475520)

FRNC-TH-761 PC **A10**/MF **A01**
Paris-7 Univ. (France).
Microscopic Theory of Elementary Excitations of Nuclei.
J. P. Blaizot. 1977, 207p
In French.Thesis.
U.S. Sales Only.

The theory of the elementary excitations of the nuclei in a formalism particularly adapted to the uses of the forces depending on density is presented. It is shown how the total energy of the nucleus is calculated from the effective interaction. This energy is considered as being a functional of the one-body density matrix; from this is derived the mean field and the particle-hole interaction which enable the Hamiltonian to be constructed for the elementary excitations. Green's functions with one or two particles are used for comparing this theory with Migdal's, to give a consistent framework to the calculation of processes bringing in the particle-vibration coupling, and to understand the nature of the particle-hole interaction in relation with the particle-particle interaction. As an illustration, two solvable models are presented. In the first one the particle-hole interaction is separable and the second one studies the response function in the nuclear matter at the boundary of weak transfer moments (damping of the collective mode, collective modes in infinite systems). (Atomindex citation 10:490046)

HU-TFT-78-7 PC **A02**/MF **A01**
Helsinki Univ. (Finland). Research Inst. for Theoretical Physics.
Prediction of the A sub 1 -B, the Q sub 1 -Q sub 2 Mass Difference and the Q sub 1 -Q sub 2 Mixing.
R. Kinnunen, and N. A. Toernqvist. Feb 78, 18p
U.S. Sales Only.

Unitarity and analyticity can explain the mass splitting and the mixing observed in the Q sub 1 - Q sub 2 resonances if one assumes as input near degenerate SU(3) 1 exp ++ and 1 exp +- multiplets. Similarly the B - A sub 1 mass splitting due to the PV thresholds is predicted to be 48 MeV. (Atomindex citation 10:475597)

HU-TFT-78-9 PC **A02**/MF **A01**
Helsinki Univ. (Finland). Research Inst. for Theoretical Physics.
Dynamical Model for Narrow Resonances.
N. A. Toernqvist. Mar 78, 18p
U.S. Sales Only.

Using fairly general unitarity and analyticity arguments, we discuss how a degenerate multiplet of states mix and split in mass because of their coupling to common channels. Largely independently of what the input parameters are, a simple picture emerges: (i) The physical resonances have vastly different widths. (ii) The narrowest resonances couple weakly to the large phase space channels. (iii) The mass splittings are correlated to the widths such that the narrower the resonance, the heavier it is in mass. A numerical example is given. (Atomindex citation 10:475635)

HU-TFT-79-13 PC **A03**/MF **A01**
Helsinki Univ. (Finland). Research Inst. for Theoretical Physics.
Jet Production in E exp + E exp - Collisions to Order alpha exp 3 and alpha exp 4 and Including QCD Corrections.
K. Kajantie, and R. Raitio. 1979, 39p
U.S. Sales Only.

Cross sections for e exp + e exp - implies jet sub 1 +jet sub 2 +X are calculated to order alpha exp 3 and alpha exp 4 in the electromagnetic couplings and to arbitrary order in alpha /sub s/ in the leading logarithm approximation of QCD. Physically the processes included are emission of hard photons from the incident e exp +- followed by annihilation, photon-photon scattering and deep inelastic scattering on an electron. The experimental separation of the mechanisms on the basis of their different event structures is discussed. (Atomindex citation 10:475588)

HU-TFT-79-7 PC **A02**/MF **A01**
Helsinki Univ. (Finland). Research Inst. for Theoretical Physics.
QCD Predictions for Deep Inelastic Scattering on an Electron.
K. Kajantie. 1979, 13p
U.S. Sales Only.

Predictions of QCD for deep inelastic scattering on an electron, e exp + e exp - implies e exp + X, are worked out and their testability in very high energy e exp + e exp - collisions is discussed. The simplest experiment is that in which only the recoiling quark jet is detected, the difficult fast forward e exp +- detection is not necessary. (Atomindex citation 10:475589)

IA-1353 PC **A04**/MF **A01**
Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center.
Curium-244 Neutron Data Evaluation.
M. Caner, and S. Yiftah. Mar 79, 55p
U.S. Sales Only.

An evaluation of neutron nuclear data was performed for the isotope curium-244. The energy range covered was 10 exp -3 eV to 15 x 10 exp 6 eV. All significant cross sections were considered. In the resolved resonance range, a maximum likelihood method was developed for the area analysis of underdetermined data. In the fast neutron energy range, spherical optical model and statistical theory calculations were done. The (n,xn) cross sections were calculated using a formalism based on compound nucleus decay, with an improved treatment of (n,3n) competition. (Atomindex citation 10:475792)

IAE-3046 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
"TEKDA" - Complex for Storage, Editing and Usage of Data Bank on the BESM-6 Computer.
V. A. Chistyakova, and M. S. Yudkevich. 1978, 10p
In Russian.
U.S. Sales Only.

Presented is the description of the complex of "TEKDA" programs intended for evaluated neutron data banks. The complex provides the means for bank editing and operation with the data bank in the FORTRAN language. The "TEKDA" involves the transition programs of various data banks to the common form and their recording with editing texts. The "TEKDA" complex provides conditions for simplified handling of the bank data and for data editing; it simplifies the process of data bank operation - searching and selecting necessary information, checking, copying, filing of documents, etc. (Atomindex citation 10:492346)

IAEA-NDS-1 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). Nuclear Data Section.
Short Guide to EXFOR.
A. Calamand, and H. D. Lemmel. 1974, 6p
U.S. Sales Only.

EXFOR is the exchange format agreed upon for the magnetic-tape transmission of experimental nuclear reaction data between national and international nuclear data centers: A brief introductory description of the original version of EXFOR, for neutron nuclear data, is given. The two output formats, "standard" and "edited", that are available from the IAEA Nuclear Data Section are described. (Atomindex citation 10:492306)

IAEA-NDS-3(Rev.79/6) PC **A14**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). Nuclear Data Section.
NDS EXFOR Manual.
H. D. Lemmel. Jun 79, 301p
U.S. Sales Only.

This manual contains the coding rules and formats and NDS internal compilation rules for the exchange format (EXFOR) for the transmission of nuclear reaction data between national and international nuclear data centres, and for the data storage and retrieval system of the IAEA Nuclear Data Section. (Atomindex citation 10:492307)

IAEA-NDS-4(Rev.79/7) PC **A06**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). Nuclear Data Section.
System Specifications for the NDS EXFOR System.
P. M. Attree, and P. M. Smith. Jul 79, 101p
U.S. Sales Only.

EXFOR is the agreed exchange format for the magnetic-tape exchange of nuclear reaction data between national and international nuclear data centres for the benefit of nuclear data users in all countries. The NDS EXFOR System is a computerized system for the storage and retrieval of EXFOR information compiled or received by the IAEA. This document is an internal manual for the system specifications of the NDS EXFOR System. It includes flow charts, system and program summaries, input and output specifications and file and record descriptions. The manual is updated from time to time when system modifications are made. (Atomindex citation 10:492338)

IC-77-40 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Dynamics of a Six-Quark Deuteron: Form Factor and Structure Functions.
A. N. Mitra. May 77, 11p
U.S. Sales Only.

Using a colour-dependent h.o. q-q interaction, incorporating the saturation property at the 3q level and of the same strength as provides the baryonic M exp 2 spectrum, a 6q wave function, antisymmetric with regard to both q implies q and 3q implies 3q cluster interchanges, is constructed as an explicit solution of a 6-body Schroedinger equation. Applications to elastic and deep-inelastic e-d scattering reveal good agreement with the data without adjustable parameters. (Atomindex citation 10:440218)

IFUSP-P-158 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Electromagnetic Mass Difference of Pions and the Radial Excitations of the rho-A sub 1 - pi System.
I. Kimel, and R. V. Caffarelli. Jan 79, 6p
U.S. Sales Only.

The calculation of the electromagnetic mass difference of pions taking into account radial excitations is revised. A very good result for delta m/sub pi / = m/sub pi +/ - m/sub pi exp 0 / is obtained. (Atomindex citation 10:475596)

IFVE-OEF-78-103 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Direct Positron Production in pN Interactions at 70 GeV.
S. A. Akimenko, V. I. Belousov, A. M. Blick, V. M. Kutiin, and A. S. Soloviev. 1978, 16p

U.S. Sales Only.

The value for the ratio R of direct positrons to pi exp + mesons produced from interaction of the 70 GeV internal proton beam with a thin (1 mu m) carbon film has been measured. The following value was obtained: R = approximately 3x10 exp -5 . The experimental data on direct component of leptons are discussed from the viewpoint of leptonic decays of various sources; in particular, contributions from leptonic and semileptonic decays of new particles to the observed values for R have been analyzed. (Atomindex citation 10:475641)

INIS-mf-4204 PC **A08**/MF **A01**
Forskningsinstitutet foer Atomfysik, Stockholm (Sweden).
Annual Report 1977. Research Institute of Physics, Stockholm Sweden.
A. Nilsson. 1978, 169p
U.S. Sales Only.

A summary of the research activities during 1977 is presented. The following headings are given: Atomic and Molecular Physics, Surface Physics, Nuclear Physics, Nuclear Theory, Exotic Atoms, and Instrumentation and Methods. Lists of publications, seminars, conferences, and personnel are given. (Atomindex citation 09:376879)

INIS-mf-4660 PC **A02**/MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Microscopic Theory of One-Body Dissipation.
S. E. Koonin, J. Randrup, R. Hatch, and V. Kolomietz. 1977, 17p CONF-770968-36
International conference on nuclear structure, Tokyo, Japan, 5 Sep 1977.
U.S. Sales Only.

A microscopic theory is developed for nuclear collective motion in the limit of a long nuclear mean-free path. Linear response techniques are applied to an independent particle model, and expressions for the collective kinetic energy and rate of energy dissipation are obtained. For leptodermous systems, these quantities are characterized by mass and dissipation kernels coupling the velocities at different points on the nuclear surface. In a classical treatment, the kernels are given in terms of nucleon trajectories within the nuclear shape. In a quantal treatment, the dissipation kernel is related to the nuclear Green function. The spatial and thermal properties of the kernels are investigated. Corrections for the diffuseness of the potential and shell effects are also discussed. (Atomindex citation 10:435564)

INIS-mf-4795 PC **A06**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Semiclassical Methods in Field Theories.
Tese (Ph.D.),
I. Ventura. Oct 78, 107p
In Portuguese.
U.S. Sales Only.

A new scheme is proposed for semi-classical quantization in field theory - the expansion about the charge (EAC) - which is developed within the canonical formalism. This method is suitable for quantizing theories that are invariant under global gauge transformations. It is used in the treatment of the nonrelativistic logarithmic theory that was proposed by Bialynicki-Birula and Mycielski - a theory we can formulate in any number of spatial dimensions. The nonlinear Schroedinger equation is also quantized by means of the EAC. The classical logarithmic theories - both the nonrelativistic and the relativistic one - are studied in detail. It is shown that the Bohr-Sommerfeld quantization rule(BSQR) in field theory is, in many cases, equivalent to charge quantization. This rule is then applied to the massive Thirring Model and the logarithmic theories. The BSQR can be see as a simplified and nonlocal version of the EAC. (Atomindex citation 10:438661)

INIS-mf-5078 PC **A02**/MF **A01**
Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center.
Report on the IAEA Coordinated Research Programme on the Intercomparison of Evaluations of Actinide Neutron Nuclear Data.
S. Yiftah. Mar 79, 13p CONF-790533-2
IAEA Advisory Group meeting on transactinium isotope nuclear data, Cadarache, France, 2 May 1979.

U.S. Sales Only.

Following discussions and Consultants Meeting in 1976, the IAEA, in response to recommendations made, formed two coordinated research projects (CRP): one on the Intercomparison of Evaluations of Actinide Neutron Nuclear Data, the other on the Measurement and Evaluation of Transactinium Isotope Nuclear Decay Data. This report covers work done, and to be done, in the framework of the first CRP, as well as some of the practical problems for future work. (Atomindex citation 10:475861)

INIS-mf-5079 PC **A02**/MF **A01**
Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center.
Methodology of the Intercomparison of TND Evaluations.
S. Yiftah, M. Caner, and Y. Gur. Mar 79, 10p
U.S. Sales Only.

The paper presents the problems which arise when two independent complete nuclear data evaluations of the same nuclide are available. A detailed intercomparison of the evaluations can be a multi-levelled exercise of considerable detail, the stages of which cannot always be performed. However, a detailed intercomparison can be a rich source for improving considerably the nuclear data used for the different applications. Preliminary examples of intercomparison are given for illustrative purpose. (Atomindex citation 10:475862)

INIS-mf-5091 PC **A07**/MF **A01**
Ghent Rijksuniversiteit (Belgium). Lab. voor Kernfysica.
Contribution to the Study of the Influences of the Excitation Energy on the Characteristics of the Fission Process.
C. Wagemans. 1979, 146p
In Dutch.Thesis.
U.S. Sales Only.

Neutron-induced and spontaneous fission with neutron energies from 10 exp -2 to 2 x 10 exp 5 eV have been studied. Thermal-neutron-induced fission measurements in Pa exp 231 , Th exp 232 , Np exp 237 , U exp 233 , U exp 235 , Pu exp 239 and Pu exp 241 are reported. Energy and mass distributions of heavy fission fragments due to the spontaneous fission of Pu exp 240 are compared to the results obtained by thermal neutron fission of Pu exp 239 ; the events observed with U exp 236 , Pu exp 240 , Pa exp 232 and Np exp 238 are explained by the Bohr theory of fission channels. Ternary fission phenomena of U exp 233 , U exp 235 , Pu exp 239 , Pa exp 231 and Np exp 237 induced by thermal neutrons are explained and compared to models of Carjan and Feather. (Atomindex citation 10:490110)

INIS-mf-5315 PC **A06**/MF **A01**
Technische Univ., Vienna (Austria).
Deformation Energy of Atomic Nuclei in the Shell Model.
H. Cech. Mar 78, 116p
In German.Thesis.
U.S. Sales Only.

The object of this thesis is to calculate the energy of the nucleus of mean potential using the shell model. The models of Nilsson and Strutinsky are employed and compared. The central density is examined in terms of deformation, assuming that central density remains constant. Preservation of volume is assumed and corrections are calculated for various elements. Good agreement is claimed for the rare earths and actinides having nearly constant central density. The energy of various nuclear particles is plotted, pair interaction is examined and total energy is computer-plotted. The total central density is stated to vary by up to 27 per cent as a delta-parameter is altered up to a value of 0.5. (Atomindex citation 10:490052)

IPNO-TH-77-51 PC **A03**/MF **A01**
Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire.
Inverse Problem at Fixed Energy for Finite Range Complex Potentials.
P. Sergent, and C. Coudray. Oct 77, 40p
U.S. Sales Only.

In the inverse problem of scattering theory, a simple transformation may be used to map the results for a fixed l=0 value of the angular momentum onto similar results at fixed energy concerning a finite-range potential. This property is applied to non-self-adjoint operators corresponding to complex potentials. Following a study of such operators at fixed l values, one gives the condition for the scattering data to be coherent, the fundamental equation is derived and the uniqueness of the reconstructed potential is proved. A last paragraph shows that the scattering data of this final potential are the initial ones. (Atomindex citation 09:410298)

JINR-E-1-11519 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Cumulative Production of Protons and lambda Hyperons in the Interactions of Fast Negative Pions and Neutrons with Carbon Nuclei.
B. A. Shahbazian, P. P. Temnikov, and A. A. Timonina. 1978, 10p
U.S. Sales Only.

The inclusive production of protons and lambda hyperons outside the kinematical region for the reactions on free nucleons, in pi exp - exp 12 C at P=4.0 GeV/c and in n exp 12 C at < p/sub n/ >=7.0 GeV/c has been investigated. The behavior of the lambda hyperon polarization as a function of emission angle does not depend on the nature of the incident particle or on its energy. (Atomindex citation 10:475775)

JINR-E-1-11555 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Polarization of Fast Protons Emitted at 90 Deg - 130 Deg in the Inclusive Reaction p+C Implies p+... At 640 MeV.
R. Kh. Kutuev, Kh. Murtazaev, and R. Ya. Zulkarneev. 1978, 8p
U.S. Sales Only.

Energy dependence of the polarization of fast protons emitted at 90, 110 and 130 exp 0 has been measured for the p+ exp 12 C implies p+... inclusive process at 640 MeV. The 400-750 momentum range of secondary protons has been investigated by measuring the particle flight time and the energy consumed with NaI counter. It results from experimental data that the polarization of inclusive protons is very large and amounts to approximately 40%; the experimental values of polarization at 130 exp 0 coincide with the Frankel-Woloshin predictions made on the ground of the hypothesis of the high momenta component of nucleon motion inside nuclei. (Atomindex citation 10:440201)

JINR-E-1-11666 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Inclusive Neutral Particle Production in Anti Pp Interactions at 22.4 GeV/C. Part 2. Differential Distributions. Study of the lambda Polarization.
E. G. Boos, V. V. Samoilov, and Zh. S. Takibaev. 1978, 15p CONF-7806108-5
European anti-proton symposium, Strasbourg, France, 26 Jun 1978.
U.S. Sales Only.

The differential distributions over longitudinal and transverse Feynman variables for inclusive gamma , K/sub s/ exp 0 , lambda production in anti pp interactions at 22.4 GeV/c are presented. The rapidity distributions in the c.m.s. for gamma and K exp 0 /K exp 0 -tilde particles are well described by the quark-antiquark fusion model. In the central region there is some evidence for scaling behavior of the invariant differential cross sections F for the anti pp implies gamma +all in the range from 22.4 GeV/c to 100 GeV/c, while for the K exp 0 / K exp 0 tilde production F rises in this energy interval. A non-zero lambda polarization of -0.414+-0.206 was measured. (Atomindex citation 10:475657)

JINR-E-1-12031 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Multibaryon Interactions at Relativistic Energies.
A. M. Baldin. 1978, 28p CONF-780826-39
19. conference on high energy physics, Tokyo, Japan, 23 Aug 1978.
U.S. Sales Only.

The studies of interactions of high energy particles and nuclei with nuclei are summarized. One-parti-

cle distributions are mainly considered. A special attention is paid to the cumulative effect - the particle production in the region of limiting fragmentation of nuclei which is forbidden for one-nucleon collisions. A large amount of experimental information on multi-nucleon interactions has been obtained during the last two years: the range of an approximate validity of the limiting fragmentation of nuclei has been clarified; the universal energy dependence of cross sections in the cumulative region have been elucidated; data on angular distributions and polarization of the cumulative particles have been obtained; strong A-dependences have been observed in the cumulative effect; production of particles with large perpendicular momentum has been established on nuclei along with some dependences of the cumulative particle production on the quantum numbers in the production of hadron jets. The study of different manifestations of quark plasmons (fluctuons) in nuclei and multibaryon resonances predicted by quark models is an important and extensively developed trend of high energy physics. The possibility of studying the space-time picture of development of the strong interaction process by means of hadron-nucleus interaction and the particle formation length concept needs further theoretical and experimental grounds. (Atomindex citation 10:475522)

JINR-E-2-11958 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Unified Gauge Model of Weak and Electromagnetic Interactions for a Nonlinear Chiral SU(4)XSU(4) Theory of 0 exp - Mesons and 1/2 exp + Baryons.
D. Ebert, and M. K. Volkov. 1978, 31p
U.S. Sales Only.

A nonlinear realization of the SU(2)/sub L/xU(1) gauge group has been constructed using a chiral SU(4)xSU(4) lagrangian of hadrons. Weak and electromagnetic interactions of 0 exp - mesons and 1/2 exp + baryons are described. The effective lagrangian obtained for the weak interaction of hadrons has the usual current x current structure. Charmed charged currents are of the Cabibbo type, the neutral current satisfies the delta S=0 condition of the GIM-scheme. Semileptonic and leptonic decays of D- and F-mesons are calculated. (Atomindex citation 10:475555)

JINR-E-2-11965 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Penetration Probabilities of High Energy Heavy Ion Projectiles into a Target Nucleus.
H. Iwe. 1978, 12p
U.S. Sales Only.

Penetration probabilities of high-energy heavy ion projectiles into a target nucleus are estimated in the framework of three approaches. First, the target is treated as an absorbing medium, and the penetration probability of the projectile as a function of the run-through distance is calculated. Second, the same is performed on the basis of a microscopic consideration in the framework of the one-dimensional scattering model. Finally, these results are compared to those obtained by intranuclear-cascade model calculations. The results in each case agree with each other. It is shown that alpha -particles may enter a silver nucleus with the probability of 1.5%. (Atomindex citation 10:475743)

JINR-E-4-10588 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Radial Dependence of the Shell-Model Potential.
E. Balazs, and V. V. Pashkevich. 1977, 19p
U.S. Sales Only.

A method is described for determining the dependence of the shell-model potential on the radial variable for a spherical or deformed nucleus. It is based on a self-consistent procedure with statistically average nucleon density. Introduced is an approximation to the density, in which an angular dependence of the density is neglected and only the average radial dependence is studied. The notion of the radial dependence is defined for a deformed nucleus. As examples, the potentials calculated for a number of nuclei of spherical shape and for the exp 240 Pu nucleus of several deformed shapes are given. (Atomindex citation 10:439820)

JINR-E-4-11012 PC **A04**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Quasiparticle-Phonon Nuclear Model. Basic Assumptions.
V. G. Soloviev. 1977, 68p
U.S. Sales Only.

The general assumptions of the quasiparticle-phonon model of complex nuclei are given. The choice of the model hamiltonian as an average field and residual forces is discussed. The phonon description and quasiparticle-phonon interaction are presented. The system of basic equations and their approximate solutions are obtained. The approximation is chosen so as to obtain the most correct description of few-quasiparticle components rather than of the whole wave function. The method of strength functions is presented, which plays a decisive role in practical realization of the quasiparticle-phonon model for the description of some properties of complex nuclei. The range of applicability of the quasiparticle-phonon nuclear model is determined as few-quasiparticle components of the wave functions at low, intermediate and high excitation energies averaged in a certain energy interval. (Atomindex citation 10:440034)

JINR-E-4-11353 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Description of Nuclear States in a Wide Range of Excitation Energies.
V. G. Soloviev. 1978, 23p CONF-780386-2
28. conference on nuclear spectroscopy and structure of the atomic nucleus, Alma-Ata, USSR, 28 Mar 1978.
U.S. Sales Only.

Within the quasiparticle-phonon nuclear model the description of few-quasiparticle components of nuclear states at low, intermediate and high excitation energies is given. For the low-lying states the energy of each level is calculated. The few-quasiparticle components at intermediate and high excitation energies are represented to be averaged in certain energy intervals, and their characteristics are given as the corresponding strength functions. The fragmentation of single-particle states in deformed nuclei is studied within this model. The dependence of neutron strength functions on the excitation energy is investigated for the transfer reactions of the type (d, p) and (d, t). A correct description of the radiative strength functions in spherical nuclei is obtained. The energies and E lambda - strength functions for giant multipole resonances in spherical and deformed nuclei are calculated. A correct description of their widths is obtained. (Atomindex citation 10:475778)

JINR-E-4-11626 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Form and Partial Widths of Neutron Resonance.
V. G. Soloviev. 1978, 6p
U.S. Sales Only.

For the experimental check of general assumptions some problems on neutron resonances were formulated. It was proposed to measure the form of the isolated resonance, to verify whether there are deviations from the exponential decay law for the total probability and partial transitions and to analyze the relations between the probabilities of partial transitions with changing energy inside the resonance from its lower part to the peak and upper part. It was shown that rather wide isolated neutron resonances in atomic nuclei are a convenient tool for these investigations. (Atomindex citation 10:475779)

JINR-E-4-11682 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Collective Phenomena in Hypernuclear Ground States.
J. Zofka, and M. Sotona. 1978, 10p
U.S. Sales Only.

In the hyperspherical scheme, pertinent to radial oscillations, the influence of added lambda -hyperon on the structure of hypernuclear ground states of corresponding doubly magic nuclear cores has been studied. Possible consequences of values of lambda -binding energies, radii and coulomb energies on lambda -N interaction have been shown. The relation to the nuclear compressibility has been analyzed. (Atomindex citation 10:440063)

JINR-E-6-11819 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Computer-Building of gamma-Ray Decay Schemes on the Basis of gamma-gamma Coincidences.
Z. Hons. 1978, 11p
U.S. Sales Only.

A method is given for building gamma-ray decay schemes based on gamma-gamma coincidences. This method takes into account total intensities and energies of gamma transitions. The set of initial rules which satisfy the predominant majority of the published decay schemes is formulated. The composing cascade method convenient for complete coincidences is given and its extended version for a general case of realistic data is suggested. A computer programme based upon this method has been used for determining sixteen decay schemes. The obtained results show 85-100 % agreement with the published ones in the transition placement and the energy levels. (Atomindex citation 10:475741)

JINR-R-3-11752 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Parameters of Ruthenium Neutron Resonances.
A. B. Popov, K. Tshetsyak, and 1978, 11p
In Russian.
U.S. Sales Only.

On the neutron spectrometer (resolution 7 ns/m) the measurements of transmission for the natural Ru and the gamma -ray yield after neutron capture of small exp 99 Ru and exp 101 Ru samples are performed. The neutron resonance parameters of exp 99 Ru and exp 101 Ru have been determined for the region up to 1 keV. Average spacings D=25+-2 and 18+-2 eV and strength functions S=(0.72+-0.16)x10 exp -4 and (0.61+-0.13)x10 exp -4 have been obtained for exp 99 Ru and exp 101 Ru, respectively. (Atomindex citation 10:475839)

JINR-R-4-11472 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Use of the Strength Function Method for Description of the Fragmentation of One-Phonon States over Complex States in Even-Even Deformed Nuclei.
G. Kyrchev. 1978, 16p
In Russian.
U.S. Sales Only.

Explicit expressions were derived for the excitation strength functions of giant multipole resonances (GMR). The obtained formulae may be used to study the influence of anharmonic effects on the structure of GMR. The method of strength functions has essentially been used. Within the quasiparticle-phonon model a mathematical apparatus is constructed for calculating the strength functions of reduced multipole transition probabilities without solving the eigenvalue equations in doubly even deformed nuclei. It is shown that if the quasiparticle-phonon interaction is excluded, the model becomes harmonic. (Atomindex citation 10:439952)

JINR-R-4-11794 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Cross Sections of Neutron Emission in the p-D and D-D Collisions at Low Energies.
G. I. Lykasov. 1978, 6p
In Russian.
U.S. Sales Only.

The data on the cross section for neutron yield in the p-d collision reaction at 10-100 MeV proton energies are systematized and generalized. The

energy dependence of neutron cross section in the pd-nX reaction at 10-100 MeV energies is given. The results of calculation of neutron cross section in the d-d collisions at initial energies of E/sub d/ =30-200 MeV are presented. (Atomindex citation 10:475756)

JINR-R-6-11987 PC **A02/MF A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Nuclear Orientation of exp 156 Tb in Gadolinium Matrix.
Ya. Dupak, M. Finger, 1978, 20p
In Russian.
U.S. Sales Only.

The decay of exp 156 Tb is studied using the method of nuclear orientation at ultralow temperatures. Asymmetry of gamma-rays emitted by the oriented exp 156 Tb nuclei have been measured in the temperature region from 14.6 to 68.4 mK. Parameters of magnetic dipole and electric quadrupole hyperfine splitting have been determined for exp 156 Tb in gadolinium matrix: a sub 0 =(9.70+-1.26)x10 exp -18 erg;; P=(1.02+-0.38)x10 exp -18 erg and the values of magnetic dipole and electric quadrupole moment of exp 156 Tb have been calculated: abs. value (mu) = (1.9+-0.3) n.m., Q=(2.9+-1.0) bn. Multipole mixing ratios are determined for a number of gamma-transitions in exp 156 Gd. (Atomindex citation 10:475798)

JINR-1-11590 PC **A02/MF A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Statistical Estimate of the Positive Particle Composition with P(>=)Psub(D)/2 in D+(C Sub 3 H sub 8) Interactions with Psub(D)=8.2 and 9.8 GeV/C.
A. Abdivaliev, A. P. Gasparyan, D. K. Kopylova, A. P. Stel'makh, and M. Suleimanov. 1978, 11p
In Russian.
U.S. Sales Only.

In a two-meter propane chamber secondary positive particles with P(>=)Psub(d)/2 were observed when studying d+(C sub 3 H sub 8) interactions with Psub(d)=8.2 and 9.8 GeV/c. Their momentum spectra were constructed which are divided into stripping, cumulative and elastic regions. Using the potential length method, a percent ratio for protons and deuterons in momentum cumulative regions was determined: at Psub(d)=8.2 GeV/c it proved to be (100+-30)% deuterons, and at Psub(d)=9.8 GeV/c it was (90+-35)%. (Atomindex citation 10:440064)

JINR-1-11826 PC **A02/MF A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Study on the Pp Implies p + X Reaction at 36 GeV/C on Events with an Identified Proton.
I. V. Boguslavskii, I. M. Gramenitskii, Z. Zlatanov, R. Lednicky, and V. I. Rud. 1978, 11p
In Russian.
U.S. Sales Only.

The experimental results of the pp implies p (slow) + X reaction at 36 GeV/c are presented. The cross sections of single and double diffraction dissociation (epsilon/sub s/=2.07+-0.21 mn, epsilon/sub D/=4.70+-0.44 mb, respectively) were obtained which are in agreement with other experimental data. The associative multiplicity < n(M exp 2 /sub x/) > as a function of the missing mass squared (M exp 2 /sub x/) squared to the identified proton was also analyzed. A different behavior of <n(M exp 2 /sub x/)> for diffraction (M exp 2 / sub x//S < or approximately = 0.1) and nondiffraction events is observed. The M exp 2 /sub x/ dependence of the <n(M exp 2 /sub x/)>D ratio (D is dispersion) is qualitatively explained on the basis of the two-component model. An analogue of KNO scaling in the system X is obtained for all values of M exp 2 /sub x/ with the help of a new scaling variable: z'=(n/sub ch/-1-a),/(<n(M exp 2 /sub x/)>-a) where a = -0.87. (Atomindex citation 10:475656)

JINR-3-12095 PC **A02/MF A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Averaged Cross Sections of the exp 143 Nd(N, alpha) exp 140 Ce Reaction with 30 KeV Neutrons.
Yu. P. Popov, V. I. Salatskii, and G. Khuukhehnkhuu. 1979, 12p
In Russian.
U.S. Sales Only.

First experiments on determination of the averaged-over-resonances cross section of the exp 143 Nd(n, alpha) exp 140 Ce reaction with the help of neutrons with energy of about 30 keV extracted from the electrostatic generator are described. The obtained cross section (20+-3)10 exp -30 cm exp 2 is used to estimate an average alpha-width which is compared with the average alpha width in neutron resonance range. Their values coincide within the accuracy of determination. This is in agreement with a conclusion made in statistical theory on the constancy of alpha width. (Atomindex citation 10:475840)

JU-RR-3/77 PC **A02/MF A01**
Jyvaeskylae Univ. (Finland). Dept. of Physics.
Structure of Odd-A Pm Nuclei (I). Exp 147 Pm.
M. Kortelahti, A. Pakkanen, M. Piiparinen, T. Komppa, and R. Komu. May 77, 19p
U.S. Sales Only.

The level structure of exp 147 Pm was studied by methods of in-beam gamma -ray and electron spectroscopy using the exp 148 Nd(p,2n) reaction. Twenty-four new levels with spins between 1/2 and (15/2) were observed. The 12+-2 ns h/sub 11/2/ level at 649.3 keV decays by a strongly hindered E1 transition (1.2x10 exp -6 s.p.u.) to the (9/2) exp + level at 408.2 keV and by a M2 transition (0.15 s.p.u.) to the ground state. (Atomindex citation 10:475827)

JYFL-RR-7/78 PC **A02/MF A01**
Jyvaeskylae Univ. (Finland). Dept. of Physics.
Isomeric 9/2 exp + and the Lowest 7/2 exp - State in the Weakly Deformed N=89 Nuclei.
R. Katajanheimo, A. Siivola, T. Tuurnala, E. Hammaren, and E. Liukkonen. Nov 78, 16p
U.S. Sales Only.

The decays of the isomeric 9/2 exp + states, which have been produced by (d,p gamma) and (exp 3 He,xn gamma) reactions, have been investigated in three N=89 nuclei. The half-lives have been determined to be 5.1+-0.3 ns in exp 149 Nd and 3.5+-0.4 mu s in exp 153 Gd. In exp 155 Dy a 5.5 ns half-life was found, but we were unable to assign it to the 9/2 exp + state. The calculated E1 transition probability from the 9/2 exp + state has been used as a probe in suggesting the following main components for the lowest-lying 7/2 exp - state: 7/2 5/2 exp - (523) in exp 149 Nd, 7/2 3/2 exp - (521) in exp 153 Gd and 7/2 3/2 exp - (521) in exp 155 Dy. The corresponding 7/2 exp - state in exp 151 Sm is proposed to be 7/2 (3/2 exp - (532) + 5/2 exp - (523)). All calculations have been performed using a particle-rotor model with a nonspheroidal Wood-Saxon potential. (Atomindex citation 10:475821)

JYFL-RR-9/78 PC **A02/MF A01**
Jyvaeskylae Univ. (Finland). Dept. of Physics.
Nanosecond Lifetimes of the Low-Spin States in the Nucleus exp 147 Nd. A Particle-Rotor Model Interpretation of the Results.
E. Hammaren, E. Liukkonen, R. Katajanheimo, and T. Tuurnala. Dec 78, 22p
U.S. Sales Only.

Nanosecond lifetimes of several states in exp 147 Nd have been studied using the reaction exp 146 Nd(d,p gamma) exp 147 Nd with 10 MeV deuterons. The following lifetimes were observed: the 7/2 exp - level at 49.9 keV, (2.5+-0.5) ns; the 5/2 exp - level at 127.9 keV, (<=0.8 ns); the 9/2 exp - level at 190.3 keV, (1.1+-0.3) ns and the 1/2 exp - level at 214.6 keV, (5.9+-0.8) ns. The wave functions of the states were constructed by using an axial particle-plus-rotor model. The free parameters used are compared to the systematics observed in the neighboring heavier N=87 isotones as well as in the N=89 and 91 isotones. Transition rates within the f/sub 7/2 exp - / and h/sub 9/2 exp - / based excitations, separately, were reasonably well reproduced, while the connecting transitions indicate too strong a mixing of the shells in the calculation. (Atomindex citation 10:475811)

LBL-10356 PC **A03/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Gamma-Rays from Deep Inelastic Collisions.
F. S. Stephens. 1979, 43p CONF-790751-3
Contract W-7405-ENG-48
International summer school on heavy ion nuclear reactions, Varenna, Italy, 9 Jul 1979.

The gamma -rays associated with deep inelastic collisions can give information about the magnitude and orientation of the angular momentum transferred in these events. In this review, special emphasis is placed on understanding the origin and nature of these gamma -rays in order to avoid some of the ambiguities that can arise. The experimental information coming from these gamma -ray studies is reviewed, and compared briefly with that obtained by other methods and also with the expectations from current models for deep inelastic collisions. 15 figures. (ERA citation 05:014499)

LBL-9886 PC **A09/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Transfer Products from the Reactions of Heavy Ions with Heavy Nuclei.
K. E. Thomas, III. Nov 79, 180p
Contract W-7405-ENG-48
Thesis.

Production of nuclides heavier than the target from exp 86 Kr- and exp 136 Xe-induced reactions with exp 181 Ta and exp 238 U was investigated. Attempts were made to produce new neutron-excess Np and Pu isotopes by the deep inelastic mechanism. No evidence was found for exp 242 Np or exp 247 Pu. Estimates were made for the production of exp 242 Np, exp 247 Pu, and exp 248 Am from heavy-ion reactions with uranium targets. Comparisons of reactions of exp 86 Kr and exp 136 Xe ions with thick exp 181 Ta targets and exp 86 Kr, exp 136 Xe and exp 238 U ions with thick exp 238 U targets indicate that the most probable products are not dependent on the projectile. The most probable products can be predicted by the equation Z - Z/sub target/ = 0.43 (A - A/sub target/) + 1.0. The major effect of the projectile is the magnitude of the production cross section of the heavy products. Based on these results, estimates are made of the most probable mass of element 114 produced from heavy-ion reactions with exp 248 Cm and exp 254 Es targets. These estimates give the mass number of element 114 as approx. 287 if produced in heavy-ion reactions with these very heavy targets. Excitation functions of gold and bismuth isotopes arising from exp 86 Kr- and exp 136 Xe-induced reactions with thin exp 181 Ta targets were measured. These results indicate that the shape and location (in Z and A above the target) of the isotopic distributions are not strongly dependent on the projectile incident energy. Also, the nuclidic cross sections are found to increase with an increase in projectile energy to a maximum at approximately 1.4 to 1.5 times the Coulomb barrier. Above this maximum, the nuclidic cross sections are found to decrease with an increase in projectile energy. This decrease in cross section is believed to be due to fission of the heavy products caused by high excitation energy and angular momentum. 111 references, 39 figures, 34 tables. (ERA citation 05:014507)

MPI-PAE/Exp.El.-75 PC **A04/MF A01**
Max-Planck-Inst. fuer Physik und Astrophysik, Munich (Germany, F.R.).
Nucleon Polarization in the Reaction pi exp - p Implies pi exp + pi exp - N.
K. Rybicki, and G. Lutz. Oct 78, 63p
U.S. Sales Only.

The paper was developed in connection with an experiment in which this reaction has been measured using a polarized target. It summarizes what in principle can be learnt by a measurement of the reaction on a polarized target without having to introduce theoretical assumptions. The problem of obtaining sufficient information for a model independent determination of all amplitudes is discussed and general expressions are derived for the measurable moments of angular distribution and nucleon recoil polarization in terms of helicity and transversity amplitudes. We then give explicit expressions up to the F-wave for a measurement of the reaction on a transversely polarized target and discuss in detail the problem of determining amplitudes from the measured angular distribution. (Atomindex citation 10:440013)

NORDITA-78/18 PC **A03**/MF **A01**
Nordisk Inst. for Teoretisk Atomfysik, Copenhagen (Denmark).
Interpretation of Backbending in Terms of the Crossing of the Ground State Band with an Aligned Two-Quasiparticle Band.
R. Bengtsson, and S. Frauendorf. Apr 78, 30p
U.S. Sales Only.

The backbending in even-even rare earth nuclei is analyzed in a systematic way by assuming a constant interaction between the ground state rotational band and the lowest excited even parity band, the so called s-band. (Atomindex citation 10:431881)

ORNL-5498 PC **A10**/MF **A01**
Oak Ridge National Lab., TN.
Physics Division Annual Progress Report for Period Ending December 31, 1978.
Jun 79, 224p
Contract W-7405-ENG-26

This report contains information on the Holifield Heavy-Ion Research Facility, nuclear physics, nuclear physics with neutrons, theoretical physics, the Nuclear Data Project, accelerator-based atomic physics, magnetic fusion energy-applied physics research, electron spectroscopy, and high-energy physics, as well as lists of publications, papers presented at meetings, and other general information. Sixty-two items containing significant information were abstracted and indexed individually. (ERA citation 05:017039)

ORO-5126-97 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Physics and Astronomy.
New Methods in Nuclear Reaction Theory.
E. F. Redish. 1979, 33p CONF-790484-4
Contract EY-76-S-05-5126
American Physical Society meeting, Washington, DC, USA, 23 Apr 1979.

Standard nuclear reaction methods are limited to treating problems that generalize two-body scattering. These are problems with only one continuous (vector) degree of freedom (CDOF). The difficulty in extending these methods to cases with two or more CDOFs is not just the additional numerical complexity: the mathematical problem is usually not well-posed. It is hard to guarantee that the proper boundary conditions (BCs) are satisfied. Since this is not generally known, the discussion is begun by considering the physics of this problem in the context of coupled-channel calculations. In practice, the difficulties are usually swept under the rug by the use of a highly developed phenomenology (or worse, by the failure to test a calculation for convergence). This approach limits the kind of reactions that can be handled to ones occurring on the surface of where a second CDOF can be treated perturbatively. In the past twenty years, the work of Faddeev, the quantum three-body problem has been solved. Many techniques (and codes) are now available for solving problems with two CDOFs. A method for using these techniques in the nuclear N-body problem is presented. A set of well-posed (connected kernal) equations for physical scattering operators is taken. Then it is shown how approximation schemes can be developed for a wide range of reaction mechanisms. The resulting general framework for a reaction theory can be applied to a number of nuclear problems. One result is a rigorous treatment of multistep transfer reactions with the possibility of systematically generating corrections. The application of the method to resonance reactions and knockout is discussed. 12 figures. (ERA citation 05:014513)

SLAC-PUB-2435 PC **A03**/MF **A01**
Stanford Linear Accelerator Center, CA.
Searching for Heavy Leptons.
M. L. Perl. Nov 79, 32p CONF-7910103-4
Contract EY-76-C-03-0515
Workshop on the production of new particles in super high energy collisions, Madison, WI, USA, 22 Oct 1979.

This frankly speculative paper discusses ways in which leptons heavier than the tau (if they exist) might be found. The status of the tau is briefly reviewed, and methods for searching for sequential charged leptons beyond the tau and other charged leptons at PEP, PETRA, and CESR are sketched. Charged leptons with mass greater than 20 GeV/c exp 2 might be found at proton accelerators in hadron-hadron, photon-hadron, or nu -hadron collisions. Unstable, neutral heavy leptons might have unique, conserved lepton number or nonunique lepton number. The most difficult leptons to detect are stable neutral heavy leptons; nevertheless, a possible detection method is suggested. The obvious solution to seeking the postulated leptons is an e exp + e exp - colliding beam storage ring with c.m. energy = several hundred GeV. Until such a machine is built, one can employ Z exp 0 implies L exp + + L exp - ; the use of R/sub Z exp 0 / and GAMMA/sub Z exp 0 / in this connection is discussed. If heavier Z exp 0 's exist, the heavy lepton search can be extended to higher energies. Another solution for producing these leptons involves the use of clashing e exp + e exp - linear accelerators. Characteristics of storage rings are compared with those of clashing linacs; a general description is given of the proposed SLAC Linac-Collider, along with the physics that could be done at such a machine. 6 figures. (ERA citation 05:017026)

SLAC-219 PC **A10**/MF **A01**
Stanford Linear Accelerator Center, CA.
Schindler, R.H.
May 79, 220p
Contract EY-76-C-03-0515

A remeasurement of the resonance near E/sub cm/ = 3.77 GeV in the e exp + e exp - annihilation is presented. The properties of the resonance are used to deduce branching fractions of charmed mesons into hadronic final states. Several previously unseen decay modes are reported. Decays into Cabibbo suppressed final states are observed. The inclusive properties of D meson decays are studied, including strangeness and charged particle multiplicity. The semileptonic branching fractions for D exp 0 and D/sup -+/ are measured, providing a determination of the relative lifetimes of these particles. (ERA citation 05:017020)

WIS-PH-79/1 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
Neutron Emission in Deep Inelastic Reactions Induced by exp 86 Kr on exp 166 Er at 5.7, 7.0, and 7.9 MeV/Nucleon.
Y. Eyal, A. Garon, I. Tserruya, R. Bass, and C. R. Gould. 1979, 8p
U.S. Sales Only.

Neutron emission associated with deep inelastic collisions of exp 86 Kr with exp 166 Er has been studied as a function of bombarding energy, kinetic energy loss, fragment mass and fragment and neutron scattering angles. These measurements provide information on de-excitation processes involved in the collision, the total excitation energy of the fragments and the sharing of excitation energy between the fragments. It was concluded that for the bombardments at 496-, 602-, and 675-MeV essentially all the excitation energy is removed by neutron evaporation from fully accelerated fragments. The excitation energy is shared between the fragments in proportion to their mass, this sharing indicating energy equilibration in the intermediate composite system. Within the limits imposed by systematic errors no evidence was found for pre-equilibrium neutron emission and also for out-of-plane anisotropy of neutrons. The observed multiplicities and angular distributions of the neutrons are consistent with predictions of statistical-model calculations. The results indicate that for deep inelastic collisions of exp 86 Kr with exp 166 Er, at the end of the interaction, the system is close to thermal equilibrium. (Atomindex citation 10:475803)

ZfK-383 PC **A03**/MF **A01**
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German D.R.).
Proton-Nucleus Interactions at 640 MeV Accompanied by Backward Emission of Energetic Protons.
V. I. Komarov, E. G. Kosarev, H. Mueller, D. Netzband, and V. D. Toneev. Mar 79, 27p
U.S. Sales Only.

Spectra of protons of energies between 50 and 145 MeV emitted from carbon have been measured at angles from 105 exp 0 to 160 exp 0 with respect to the 640 MeV proton beam. The measurements have been carried out both inclusively and in coincidence with protons emitted at forward angles up to +- 40 exp 0 with energies from 255 to 330 MeV. This energy interval has been chosen in accordance with the kinematics of quasifree scattering on two-nucleon groups. Inclusive differential cross sections at 140 exp 0 and coincidence cross sections at the angle pair (-12 exp 0 , 122 exp 0) have also been measured with Be, Al, Cu and Pb targets. The data have been compared with the predictions of several models. (Atomindex citation 10:475825)

20I. Plasma Physics

AD-A083 134/7 PC **A02**/MF **A01**
Harry Diamond Labs Adelphi MD
Relativistic Two-Temperature Electron Distributions.
Technical rept.,
Howard E. Brandt. Feb 80, 16p Rept no. HDL-TR-1889

An electron distribution function is formulated to appropriately describe a collisionless, isotropic, relativistic, and nonequilibrium electron gas consisting of two populations of electrons: one in temporal equilibrium at some cold temperature and the other at a hot temperature. Characteristics of this two-temperature relativistic electron distribution are discussed. (Author)

AD-A083 343/4 PC **A05**/MF **A01**
McDonnell Douglas Astronautics Co Huntington Beach CA
Self-Consistent Nuclear Particle and Field Studies.
Final rept. Apr 77-Mar 79,
G. J. Mroz, W. P. Olson, K. A. Pfitzer, and S. Schneider. 1 Oct 79, 87p DNA-4830F, AD-E300 734
Contract DNA001-77-C-0240

The objectives of this study were to approach the problem of plasmas artificially injected into the high altitude ionosphere from the viewpoint of their interaction with the ambient electromagnetic field environment (e.g., those associated with the magnetospheric substorm and the daily wobble of the earth's dipole magnetic field) and in a self-consistent manner to examine the mutual influence of the plasma and the electromagnetic field. It was found that the natural electric fields contribute to both the drift motion and structuring of the plasma. To do this, the principal sources of the natural electric field were identified, and a model of the most persistent field (resulting from the daily variation of the magnetospheric magnetic field) was developed. The model describes the total electric field which includes a component produced by the plasma as it responds to the field induced by the wobbling dipole. The natural electric fields in the magnetosphere have periods of the order of 0.25 hour, or more, and are thus very low frequency in character. As a result they penetrate the plasmas of interest here with very little loss of energy (i.e., have large skin depths). The estimates of plasma properties were performed under several simplifying assumptions; the range of values used are typical of the cases of interest to this study. The dominant feature of the problem is the extremely low frequency range of the electromagnetic waves.

AD-A083 390/5 PC **A04**/MF **A01**
Naval Research Lab Washington DC
The 24 Inch CUSP Experiment.
Final rept.,
R. E. Pechacek, J. R. Greig, M. Raleigh, D. W. Koopman, and A. W. DeSilva. 15 Feb 80, 61p NRL-MR-4162, AD-E000 389

A spectroscopically pure, fully ionized D2 plasma containing 2 X 10 to the 19th power ions is generated from solid D2 pellets using a sequence of a 100 J Nd-Glass laser pulse and a 1000 J CO2 laser pulse. The plasma is used to fill a cusp configured magnetic field with a beta = 1 plasma. The width of the ring cusp is determined using laser scattering techniques. The laser scattering result, which agrees with chamber wall light emission and chemical deposits, is that the ring cusp is an ion Larmor radius wide, in contrast to recent experiments that have indicated that the cusp width is considerably narrower.

COO-2387-115 PC **A02**/MF **A01**
Wisconsin Univ.-Madison.
Experimental Observation of Plasma Paramagnetism in a Tokamak.
D. J. Holly, S. C. Prager, M. W. Phillips, and J. C. Sprott. Sep 79, 11p
Contract EY-76-S-02-2387

The increase in the toroidal magnetic field of a tokamak due to plasma presence is measured experimentally and compared with predictions of an equilibrium code. (ERA citation 05:005144)

GA-A-15745 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Flute-Interchange Stability in a Hot Electron Plasma.
R. R. Dominguez. Jan 80, 27p CONF-791228-1
Contract AT03-76ET51011
EBT ring physics workshop, Oak Ridge, TN, USA, 3 Dec 1979.

Several topics in the kinetic stability theory of flute-interchange modes in a hot electron plasma are discussed. The stability analysis of the hot-electron, curvature-driven flute-interchange mode, previously performed in a slab geometry, is extended to a cylindrical plasma. The cold electron concentration necessary for stability differs substantially from previous criteria. The inclusion of a finite temperature background plasma in the stability analysis results in an ion curvature-driven flute-interchange mode which may be stabilized by either hot-electron diamagnetic effects, hot-electron plasma density, or finite (ion) Larmor radius effects. (ERA citation 05:017198)

INIS-mf-4465 PC **A03**/MF **A01**
Stuttgart Univ. (TH) (Germany, F.R.). Inst. fuer Plasmaforschung.
Research Report 1976.
1976, 43p
In German.
U.S. Sales Only.

In 1976 the activities coordinated with the scientific programs of the IPP Garching have been continued. In the section 'wave and plasma heating', a) the THETA-pinch experiment has been finished, b) the investigations concerning the propagation of linearly polarized Alfven waves have been extended to wave types without axial symmetry, and c) for an investigation of the coupling of waves to current heated plasmas, the construction of a linear set-up has been started. In the section 'laser applications', the theoretically expected advantages of time-resolved scattering diagnostics with a pulsed laser could be verified experimentally. For stationary scattering in the IR (10.6 mu m), the energy-resolved measurement of the ion line of the magnetic-field stabilized high-current arc could be demonstrated. For the pulsed scattering diagnostics at 10.6 mu m with modulation detection, preliminary data of the thermal high current arc plasma spectrum have been recorded. The development of a stationary single-mode CO sub 2 laser for time-resolved scattering in the IR region with modulation detection has been put forward. In the section 'short-time techniques', the pulse width of the high-pressure nitrogen lasers could be reduced to tau = 40 psec at 15 bar. Single pulses smaller than 10 psec could be obtained by a combination of a nitrogen laser with an extremely short resonator used as a dye-laser. In the section 'dense plasma' ('plasma focus') the scaling laws of the stored energy and neutron yield have been studied. The theoretical work for interpretation of the processes occurring during the dense phase of the focus and the preparations for radiation absorption near the plasma frequency have been put forward. The annual report includes a complete list of scientific publications, reports and statements of 1976. (Atomindex citation 09:405896)

LA-UR-80-21 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Ion Beam Propagation Simulations.
D. S. Lemons. 1979, 7p CONF-7910122-1
Contract W-7405-ENG-36
Heavy ion fusion workshop, Berkeley, CA, USA, 29 Oct 1979.

A series of numerical particle-in-cell simulations of ion beam propagation have been performed with the LASL two-dimensional electromagnetic code, CCUBE. A few results for each of two different simulations are presented. They are intended to illustrate plasma effects relevant to (1) ion propagation in a relatively dense plasma background, and (2) ion vacuum propagation with co-moving electrons. (ERA citation 05:014539)

LA-8198-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Simple Model for an Upper Bound on Density Fluctuations in a Turbulent Pinch.
A. R. Jacobson. Jan 80, 5p
Contract W-7405-ENG-36

A rough scaling relationship for plasma density fluctuations driven by magnetic field disturbances is derived. The result is found to agree with an earlier theory based on acoustic waves inflating magnetic flux surfaces. (ERA citation 05:017207)

MSNW-79-1045-5 PC **A03**/MF **A01**
Mathematical Sciences Northwest, Inc., Bellevue, WA.
Axial Laser Heating of Three Meter theta Pinch Plasma.
A. L. Hoffman, and D. D. Lowenthal. Nov 79, 46p
Contract EY-76-C-06-2319

The results of a four-year effort on laser heating a 3-m long plasma in a fast rising solenoidal field are presented. It was found that beam trapping density minimums could be maintained for the length of the laser pulse if the plasma diameter exceeded about 1.5 cm. The erosion of the density minimum was governed by classical diffusion processes. Three-meter long plasmas in 2.6 cm bore plasma tubes could be fairly uniformly heated by 3.0 kJ of CO sub 2 laser radiation. Best results were obtained when heating began before or during the theta pinch implosion phase and the plasma fill pressure exceeded 1.0 torr H sub 2 . Plasma line energies of about 1 kJ/m could be obtained in a magnetic field rising to 6 tesla in 4.7 mu sec. (ERA citation 05:017165)

N80-22080/9 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Collisional Effects on the Electromagnetic Instability for a Relativistic Electron Beam Penetrating a Plasma.
T. Okada, and K. Niu. Feb 80, 13p IPPJ-439

The electromagnetic instability of a relativistic electron beam penetrating an infinite plasma was analyzed to determine the effect of collisions within the plasma upon the growth rate of a Weibel-type electromagnetic instability. The dispersion relation including the effect of collisions is solved analytically and numerically. It is found that collisions can enhance the growth rate of the electromagnetic instability in the case of low plasma temperature.

ORNL/TM-7075 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Eikonal Expansion of the Vlasov-Maxwell Equations Valid Near Cyclotron Resonance.
H. Weitzner, and D. B. Batchelor. Jan 80, 40p
Contract W-7405-ENG-26

In the usual formulations of geometrical optics, the physics of the medium enters the equations through a conductivity tensor operator sigma. An essential assumption in the subsequent expansion is that the magnitude of sigma/sup H/, the Hermitian part of sigma, is much smaller than sigma/sup A/, the anti-Hermitian part. In a finite temperature plasma with omega /sub pe/ approx. absolute value omega /sub e/, this condition is always violated sufficiently close to cyclotron resonance, even though in many cases the waves are weakly damped and k is slowly varying. Simultaneously expanding the Vlasov equation and Maxwell equations and taking explicit account of the relative magnitude of the electric field components in the ordering scheme yields a formalism in terms of real rays, real eikonal function, and slowly varying amplitude that is valid at cyclotron resonance. It is assumed that omega /sub pe/ approx. absolute value omega /sub e/ approx. omega are large, that omega approx. = absolute value omega /sub e/, and that v/sub e/k/ omega is small. It is shown that when the waves are weakly damped at cyclotron resonance, the ray trajectories are to leading order exactly those of cold plasma theory. (ERA citation 05:017189)

ORNL/TM-7172 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Determination of Plasma Shape from Poloidal Field Measurements on ISX-B.
D. W. Swain, S. Bates, G. H. Neilson, and Y. K. M. Peng. Mar 80, 52p
Contract W-7405-ENG-48

The ISX-B tokamak has a poloidal coil system designed to produce circular, elliptical, and D-shaped plasmas. Plasma shape and low-order multipole moments of the plasma current distribution are determined from experimental measurements of B/sub Z/, B/sub R/, and/or psi around the periphery of the vacuum chamber. The experimental arrangement and method of analysis of results, using a least squares method to fit the data points to a finite current filament model, are described in this report. Plasma shape results for circular and D-shaped plasmas with b/a less than or equal to 1.5 and an analysis of the sensitivity of the technique to measurement errors are presented. The results indicate that this method gives accurate measurements of the plasma boundary and is relatively insensitivie to errors. (ERA citation 05:017170)

PPPL-1623 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Phase Locked Tracking Filters for Interferometry.
G. Cutsogeorge. Jan 80, 25p
Contract EY-76-C-02-3073

Three phase locked tracking filters that have been built for use with microwave and laser interferometers are described. Block diagrams, circuit diagrams and test data are presented. (ERA citation 05:014532)

PPPL-1626 PC **A05**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Effects of Impurity Radiation on Reversed-Field Pinch Evolution.
E. J. Caramana, and F. W. Perkins. Jan 80, 90p
Contract EY-76-C-02-3073

The effects of impurity radiation on the evolution of a reversed-field pinch plasma are studied by means of a one-dimensional MHD simulation code that includes both plasma transport and impurity effects, and follows the plasma through a series of equilibrium states. The equations are split into two sets, one that contains plasma transport and another that contains atomic physics effects. Two codes were developed and linked together to solve the full problem. Results are presented for the ZT-S, ZT-40, and RFX experiments with a fixed set of parameters, typical or envisioned, and various concentrations of impurities. Radiation barriers are encountered, and limits are found on the acceptable level of low Z impurities that may be present in these devices. It is shown that the temperatures currently observed in the ZT-S experiment are radiation limited. Next, a criterion for radiation barrier burn-through is derived in terms of appropriate nondimensional parameters and calibrated by comparison to the numerical simulations for the case of oxygen. (ERA citation 05:014543)

PPPL-1631 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Distribution of Emitters in an Elliptical Source.
E. Silver, and W. Roney. Jan 80, 21p
Contract EY-76-C-02-3073

A simple technique is presented for calculating emission profiles from elliptically shaped plasmas. (ERA citation 05:014533)

PPPL-1634 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Fluctuations, Turbulence and Transports in the Presence of Drift Waves.
H. Okuda, T. Sato, A. Hasegawa, and R. Pellat. Feb 80, 33p
Contract EY-76-C-02-3073

Turbulence spectrum and plasma diffusion have been studied by theoretical analysis as well as by numerical simulations using a drift wave model in

which electrons are assumed to follow the Boltzmann distribution, while ions are assumed to move two-dimensionally in the plane perpendicular to the magnetic field. For a plasma near local thermal equilibrium, it is found that while the ion density diffusion is negligibly small, the energy diffusion is much larger and is comparable to the test particle diffusion. In the presence of strong turbulence, deltan approx. n sub 0 , fluctuation energy is found to cascade toward long wavelength modes which accompanies the density diffusion. The resultant turbulence spectrum is isotropic in two dimensions perpendicular to the magnetic field. However, the particle diffusion coefficient remains small. When the ion density gradient is maintained by freezing the electron background density, it is found that the turbulence spectrum cascades toward smaller wavenumbers only in the direction perpendicular to the density gradient. As a result an anisotropic turbulence spectrum if formed indicating an appearance of zonal flow in this direction. (ERA citation 05:014544)

PPPL-1636 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Experimental Evidence of Charge Exchange Recombination of Highly Ionized Iron and Titanium in Princeton Large Torus.
S. Suckewer, E. Hinnov, M. Bitter, R. Hulse, and D. Post. Feb 80, 21p
Contract EY-76-C-02-3073

The observed behavior of the emissivitives of boron-like FeXXIII, lithium-like FeXXIV and TiXX, and the helium-like FeXXV ions in the PLT tokamak during highpower neutral (H exp 0 or D exp 0) beam heating is described. A substantial lowering of the dominant ionization state in the center of the discharge while the electron temperature is rising, is attributed primarily to increased recombination rate of the ions through charge exchange with neutral hydrogen. This interpretation is supported by the different space and time behavior of the lithium-like annd boron-like ions of comparable ionization potentials, and by comparisons of neutral beam heating of the plasma with ion cyclotron resonance heating, which does not appreciably change the neutral hydrogen concentration. The observations are compared with approximate zero-dimensional model calculations, using experimental plasma conditions and estimated charge exchange rates. (ERA citation 05:017179)

PPPL-1638 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Generalization of Connor and Hastie's Ripple-Trapping Coefficient, G(alpha).
R. J. Goldston, and H. H. Towner. Feb 80, 7p
Contract EY-76-C-02-3073

In their calculation of transport due to ripple trapping, Connor and Hastie employ a factor G(alpha) to take into account the poloidal variation of the depth and shape of the local magnetic wells. They assume, however, that the toroidal field ripple strength, delta, is independent of poloidal angle. In this letter, we generalize G to treat any arbitrary poloidal variation of delta, and also high beta and noncircular plasma configurations. (ERA citation 05:017191)

UCRL-82480 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Stochastic Motion Due to a Single Wave in a Magnetoplasma.
G. R. Smith. 5 Jun 79, 12p CONF-7906106-4
Contract W-7405-ENG-48
International workshop on intrinsic stochasticity in plasmas, Cargese, Corsica, France, 18 Jun 1979.

A single electrostatic wave in a magnetoplasma causes stochastic ion motion in several physically different situations. Various magnetic fields (uniform, tokamak, and mirror) and various propagation angles with respect to the field have been studied. A brief review of this work shows that all situations can be understood using the concept of overlapping resonances. Analytical calculations of the wave amplitude necessary for stochasticity have been carried out in some cases and compared with computer and laboratory experiments. In the case of an axisymmetric mirror field the calculations predict stochastic motion of ions with energy below a threshold that depends weakly on the wave amplitude and on the scale lengths of the magnetic field. Studies with an azimuthally asymmetric field show that the asymmetry causes substantial changes in the motion of some ions. (ERA citation 05:014554)

20J. Quantum Theory

AD-A083 321/0 PC **A04**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
True-Integrating Environmental Noise Monitor and Sound-Exposure Level Meter. Volume IV. Mechanical Construction and Electrical Check Out.
Final rept.,
A. J. Averbuch, and R. Brown. Mar 80, 57p Rept no. CERL-TR-N-41-VOL-4
See also Volume 1, AD-A060 958.

This volume gives the assembly, adjustment, and checkout procedures necessary to construct a U.S. Army Construction Engineering Research Laboratory (CERL) True-Integrating Environmental Noise Monitor and Sound-Exposure Level Meter. It describes the monitor's mechanical layout, wiring guidelines, adjustments to components to bring various circuits into tolerance, and steps for verifying the correct operation of the monitor. Also included are test programs to be executed by the internal microprocessor to exercise the internal circuit to help checkout or repair. (Author)

AD-A083 329/3 PC **A03**/MF **A01**
Maryland Univ College Park Dept of Physics and Astronomy
Experimental Research on Scattering.
Final rept. 1 Feb 77-30 Apr 79,
J. Weber. 21 Jun 79, 45p DNA-5013F, AD-E300 719
Contract DNA001-77-C-0223

Some aspects of the theory of coherent scattering are discussed, theoretically, together with results experiments to verify the theory. The cross sections are calculated for scattering by an ensemble, for a number of cases. These include having several kinds of particles in the final state, and inelastic scattering in which external fields provide the quantum states required for conservation of energy and momentum.

INIS-mf-4389 PC **A04**/MF **A01**
Chalmers Univ. of Technology, Goteborg (Sweden). Institutionen for Teoretisk Fysisk.
Annual Report 1977 from the Institute of Theoretical Physics, Gothenburg.
1978, 64p

This annual report includes sections on Elementary particle physics, Statistical Physics, Solid state physics and Mathematical physics as well as information on teaching activities, personnel and budgets. (Atomindex citation 09:399322)

INIS-mf-4838 PC **A12**/MF **A01**
Vrije Univ., Amsterdam (Netherlands).
Coulomb Potential in Quantum Mechanics and Related Topics.
Proefschrift (Dr.),
H. van Haeringen. 29 Sep 78, 272p
U.S. Sales Only.

This dissertation consists of an analytic study of the Coulomb interaction in nonrelativistic quantum mechanics and some related topics. The author investigates in a number of self-contained articles various interesting and important properties of the Coulomb potential. Some of these properties are shared by other potentials which also play a role in quantum mechanics. For such related interactions a comparative study is made. The principal difficulties in the description of proton-deuteron scattering and break-up reactions, due to the Coulomb interaction, are studied by working out a simple model. The bound states are studied for the Coulomb plus Yamaguchi potential, for the symmetric shifted Coulomb potential, and for local potentials with an inverse-distance-squared asymptotic behaviour. (Atomindex citation 10:442274)

INIS-mf-4846 PC **A06**/MF **A01**
Utrecht Rijksuniversiteit (Netherlands).
Transformation Properties of the Effective Action for Gauge Theories.
Proefschrift (Dr.),
C. M. E. Otten. 29 Nov 78, 102p
U.S. Sales Only.

The main purpose of this thesis is to investigate the gauge invariance properties of the effective action. In fact, the Slavnov-Taylor identities for the effective action are nothing but a compact formulation of the gauge symmetry properties of the theory. Chapter II of this thesis focuses on the derivation of the Slavnov-Taylor identities for a general gauge theory, especially the identities for proper vertices. An analysis of the group- and invariance structure of the effective action is given, using both diagrammatic and functional techniques. Moreover, the Slavnov-Taylor identities are written out explicitely up to the order g exp 4 , where g is the coupling constant of the theory. The general theory outlined in chapter II is applied to an SU(2) model containing vector bosons, scalar particles and leptons. Specifically, the interplay between finite one-loop effects and the invariance structure of the model is studied in a certain limit (the so-called large Higgs mass limit). It is shown that the results can be fully interpreted on the basis of the Slavnov-Taylor identities for proper vertices. This is done in chapter III. (Atomindex citation 10:442316)

20K. Solid Mechanics

AD-A083 265/9 PC **A03**/MF **A01**
Delaware Univ Newark Applied Mathematics Inst
A Boundary-Layer Theory for the Anisotropic Plate.
Interim rept.,
R. P. Gilbert, and M. Schneider. Mar 80, 29p TR-71A, AFOSR-TR-80-0297
Grant AFOSR-76-2879

To our knowledge the results of the pioneering paper on the boundary layer theory for plates by K. O. Friedrichs and R. F. Dressler have not been extended to anisotropic plates. Yet the basic conclusion of the above paper, namely that the equations of the three dimensional isotropic elasticity can be split into two independent systems seems to have been accepted by some authors to include also the case of anisotropic elasticity. While this happens to be true it is by no means obvious as the following presentation illustrates; hence, we believe our providing a detailed analysis of the orthotropic plate will be of interest to researchers in the field of composite materials and laminates. (Author)

AD-A083 292/3 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Free Vibrations of a Concentric Circular Conical Beam with a Concentric Circular Cylindrical Bore.
Technical rept.,
Rurik K. Loder. Feb 80, 37p ARBRL-TR-02216, AD-E430 396

An analytical solution describing the free transverse vibration of a concentric circular conical tube with a concentric circular cylindrical bore has been derived for a variable domain which is characteristic for ballistic tubes. Eigenvalues and eigenvectors are discussed for a particular set of boundary conditions.

AD-A083 338/4 PC **A04**/MF **A01**
Lockheed Missiles and Space Co Inc Palo Alto CA Palo Alto Research Lab
Dynamic Instability of an Elastic Cylindrical Shell Excited by a Transient Acoustic Wave.
Interim rept. 14 Nov 77-12 Jul 79,
T. L. Geers, and C. L. Yen. 12 Jul 79, 61p LMSC/D676760, DNA-5026Z, AD-E300 740
Contract DNA001-78-C-0029

Governing equations are developed for the dynamic instability of an infinite, elastic, circular cylindrical shell submerged in an infinite fluid medium and excited by a transverse, transient acoustic wave. These equations derive from circumferential Fourier series decomposition of the field quantities appearing in appropriate energy functionals, and

from application of the 'residual potential formulation' for rigorous treatment of the fluid-structure interaction. Extensive numerical results are presented that provide understanding of the phenomenology involved and permit evaluation of the 'doubly asymptotic approximation' for treatment of the fluid-structure interaction. (Author)

PB80-171077 PC **A02**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Civil Engineering.
Dynamic Stability of Shallow Elastic Arches and Shells,
S. M. Holzer, and R. H. Plaut. Apr 80, 15p VPI-E-80-13
Grant NSF-CME79-20781

Recent work on the snap-through instability of shallow elastic structures under dynamic loading is reviewed. The investigations cited involve circular arches, lattice structures, and spherical shells. The loads are usually applied uniformly over the structure, although some papers examine the effect of asymmetric components in the load distribution. Timewise, a variety of load applications is considered: impulse loads, step loads with infinite duration, triangular pulse loads, N-shaped pulse loads, and sine-wave pulse loads. A number of techniques are used for discretization in space and time. Various definitions of critical load are employed, including the Budiansky-Roth criterion and Hsu's sufficient condition.

PB80-810617 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Structural Mechanics Software. May, 1975-1978 (Citations from the NTIS Data Base).
Rept. for May 75-78,
Brian Carrigan. May 80, 246p
See also March, 1971-April, 1975, NTIS/PS-76/0436.

The use of computer programs in structural analysis-design problems are cited. Detailed analyses are included of structural problems--applied and theoretical--including stress analysis, vibration, deformation, etc. (This updated bibliography contains 240 abstracts, none of which are new entries to the previous edition.)

PB80-810625 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Structural Mechanics Software. 1979-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Apr 80,
Brian Carrigan. May 80, 70p
Supersedes NTIS/PS-79/0572 and NTIS/PS-78/0551. See also March, 1971-April, 1975, NTIS/PS-76/0436 and May, 1975-1978, PB80-810617.

The use of computer programs in structural analysis-design problems are cited. Detailed analyses are included of structural problems--applied and theoretical--including stress analysis, vibration, deformation, etc. (This updated bibliography contains 64 abstracts, 39 of which are new entries to the previous edition.)

PNL-3165 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Collapse of Experimental Capsules under External Pressure.
F. A. Simonen, and R. J. Shippell, Jr. Jan 80, 38p
Contract EY-76-C-06-1830

Stress analyses and developmental tests of capsules fabricated from thick-walled tubing were performed for an external pressure design condition. In the design procedure no credit was taken for the expected margin in pressure between yielding of the capsule wall and catastrophic collapse or flattening. In tests of AISI-1018 low carbon steel capsules, a significant margin was seen between yield and collapse pressure. However, the experimental yield pressures were significantly below predictions, essentially eliminating the safety margin present in the conservative design approach. The differences between predictions and test results are attributed to deficiencies in the plasticity theories commonly in use for engineering stress analyses. The results of this study show that the von Mises yield condition does not accurately describe the yield behavior of the AISI-1018 steel tubing material for the triaxial stress conditions of interest. Finite element stress analyses successfully predicted the transition between uniform inward plastic deformation and ovalization that leads to catastrophic collapse. After adjustments to correct for the unexpected yield behavior of the tube material, the predicted pressure-deflection trends were found to follow the experimental data. (ERA citation 05:013194)

SAND-79-2284 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
UCMD92: Mass Properties Analysis User Guide.
J. E. Malloch. Dec 79, 55p
Contract EY-76-C-04-0789

The use of a mass properties (weight, volume, area, center of gravity, moments and products of inertia) analysis computer program implemented on the Applicon 3D Graphics System (AGS/880) is presented. 38 figures, 3 tables. (ERA citation 05:012885)

SAND-79-2285 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
UCMD92: Mass Properties Analysis Programmer Guide.
J. E. Malloch. Dec 79, 43p
Contract EY-76-C-04-0789

A description of the administration, design, algorithms, and computer programing of the UCMD92 mass properties analysis program implemented on the Applicon 3D Graphics System (AGS/880) is presented. (ERA citation 05:017294)

20L. Solid-State Physics

AD-A083 055/4 Not available NTIS
Mcgill Univ Montreal (Quebec) Dept of Electrical Engineering
Development of Various Forms of Energy in Piezoelectric Semiconductors,
T. Zold. 29 Nov 73, 8p DRB-REPRINT-4040
Availability: Pub. in Physical Review B, v9 n8 p3407-3414, 15 Apr 74 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 057/0 Not available NTIS
McGill Univ Montreal (Quebec) Dept of Electrical Engineering
Harmonic Generation of Acoustic Surface Waves in Bi12GeO20 and LiNbO3,
Eric L. Adler, Edouard Bridoux, Gerard Coussot, and Eugene Dieulesaint. 28 Feb 72, 4p DRB-REPRINT-4042
Availability: Pub. in IEEE Transactions on Sonics and Ultrasonics, vSU-20 n1 p13-16 Jan 73 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 066/1 Not available NTIS
Royal Military Coll of Canada Kingston (Ontario)
Flow Stress of Pb-4 at.% In Alloy in the Normal and Superconducting States,
T. S. Hutchison, and S. L. McBride. 2 May 73, 4p DRB-REPRINT-4050
Availability: Pub. in Canadian Jnl. of Physics, v51 n17 p1797-1799, 1 Sep 73 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 096/8 PC **A07**/MF **A01**
Hughes Research Labs Malibu CA
Gallium Arsenide Advanced Crystal Growth and Beam Processing.
Final progress rept. 1 May 78-30 Jul 79,
C. L. Anderson. Jan 80, 148p
Contract N00014-78-C-0337, ARPA Order-3564

This report describes the progress made during a fifteen-month program to study the feasibility of growth of high-purity epitaxial quality bulk GaAs crystals from solution and annealing of implanted layers and Ohmic contacts for device applications using laser and electron beams. Millimeter-thick crystals have been grown by the low-temperature solution-growth process. Room-temperature n-type carrier concentrations of 2 times 10 to the 15th power/cu.cm. and liquid nitrogen mobilities of 30,000 sq. cm/V/sec have been achieved. Theoretical studies of a variety of potential growth configurations were performed. A detailed study of the laser of annealing implanted layers and Ohmic contacts was performed using several Q-switched and cw lasers. State-of-the-art results were achieved in both the implant-annealing and Ohmic-contact areas. Preliminary investigations of the annealing of implanted layers and Ohmic contacts using pulsed electron beams were also performed. (Author)

AD-A083 234/5 PC **A14**/MF **A01**
Illinois Univ At Urbana-Champaign Coordinated Science Lab
Annual Progress Report for July 1, 1978 through June 30, 1979,
R. T. Chien, G. G. Judge, and H. V. Krone. Aug 79, 320p
Contracts DAAG29-78-C-0016, N00014-79-C-0424

Contents: Molecular Beam Epitaxy, Semiconductor Materials and Devices, Quantum Electronics, Semiconductor Physics, Thin Film Physics, Microwave Acoustics, Surface Studies, Electromagnetic Communication, Radiation and Scattering, Plasma Physics, Rarefied Gas Dynamics, Computational Gas Dynamics, Fault-Tolerant Systems and Computer Architecture, Display, Memory, and Computer Terminal research, Applied Computation Theory, Advanced Automation, Information Retrieval Research, Communications, Analog and Digital Circuits, Decision and Control, and Population/Food/Weather Studies.

AD-A083 275/8 Not available NTIS
Sussex Univ Brighton (England) School of Mathematical and Physical Sciences
Properties of the Localized-Spin-Fluctuating System Pt Co. I. Susceptibility and Magnetization,
G. A. Swallow, Gwyn Williams, and A. D. C. Grassie. 4 Jun 74, 7p DRB-REPRINT-4089
See also AD-A083 276.
Availability: Pub. in Physical Review B, v11 n1 p337-343, 1 Jan 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 276/6 Not available NTIS
Sussex Univ Brighton (England) School of Mathematical and Physical Sciences
Properties of the Localized-Spin-Fluctuating System Pt Co. II. Resistivity and Magnetoresistance,
Gwyn Williams, G. A. Swallow, and J. W. Loram. 4 Jun 74, 8p
Contract F61052-68-C-0011
See also AD-A083 275.
Availability: Pub. in Physical Review B, v11 n1 p344-350, 1 Jan 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 397/0 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Intrinsic-Defect Photoluminescence in Amorphous and Crystalline SiO2,
C. M. Gee, and Marc Kastner. 1980, 8p
Contract DAAG29-78-C-0020
Pub. in Jnl. of Non-Crystalline Solids, 35 & 36 p927-932 1980.

No abstract available.

AD-A083 465/5 Not available NTIS
National Research Council of Canada Ottawa (Ontario) Div of Physics
The de Haas-van Alphen Effect in PdTe2,
A. E. Dunsworth. 30 Sep 74, 7p
Availability: Pub. in Jnl. of Low Temperature Physics, v19 n1/2 p51-57 1975 (No copies furnished by DTIC/NTIS).

No abstract available.

CONF-7706168- PC **A23**/MF **A01**
Centre National de la Recherche Scientifique, Odeillo (France). Lab. des Ultra-Refractaires.

Refractory Oxides for High Temperature Energy Sources.
1977, 542p
In English and French.Conference on materials for high temperature energy sources, Odeillo, France, 27 Jun 1977.
U.S. Sales Only.

Separate abstracts have been prepared for items within the scope of the energy data base. (ERA citation 05:016183)

DOE/ER/01198-1296 PC **A13**/MF **A01**
Illinois Univ. at Urbana-Champaign. Digital Computer Lab.
Thermal Vacancies and Phase Separation in BCC Mixtures of Helium-3 and Helium-4.
B. A. Fraass. 1980, 286p
Contract EY-76-C-02-1198
Thesis.

Thermal vacancy concentrations in crystals of exp 3 He- exp 4 He mixtures have been determined. A new x-ray diffractometer-position sensitive detector system is used to make measurements of the absolute lattice parameter of the helium crystals with an accuracy of 300 ppM, and measurements of changes in lattice parameters to better than 60 ppM. The phase separation of the concentrated exp 3 He- exp 4 He mixtures has been studied in detail with the x-ray measurements. Vacancy concentrations in crystals with 99%, 51%, 28%, 12%, and 0% exp 3 He have been determined. Phase separation has been studied in mixed crystals with concentrations of 51%, 28%, and 12% exp 3 He and melting pressures between 3.0 and 6.1 MPa. The phase separation temperatures determined in this work are in general agreement with previous work. The pressure dependence of T/sub c/, the phase separation temperature for a 50% mixture, is found to be linear: dT/sub c//dP = -34 mdeg/MPa. The x-ray measurements are used to make several comments on the low temperature phase diagram of the helium mixtures. (ERA citation 05:013895)

IAE-2999 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Theory of mu exp + Depolarization in Rare Earth Metals Near Neel Temperature.
I. G. Ivanter, and S. V. Fomichev. 1978, 20p
In Russian.
U.S. Sales Only.

The mu exp + depolarization was studied in heavy rare earth metals near the Neel temperature. The relation between the depolarization rate and correlation functions of the fluctuating magnetic field of the medium in the point of muon localization was obtained. The expression for the polarization time behaviour in monocrystals and polycrystals have been found out. (Atomindex citation 10:489000)

IEA-DT-051 PC **A05**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil).
Radio and Photostimulated Thermoluminescence of the LiF:Mg.
L. V. E. Caldas. Mar 78, 79p
In Portuguese.Thesis.
U.S. Sales Only.

Some thermoluminescent properties of LiF are studied, related with supralinearity, sensibilization and radio- and photostimulated thermoluminescence. (Atomindex citation 10:424331)

INIS-mf-4034 PC **A04**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Microwave Absorption of Amorphous Superconductors.
Diss. (D.Sc.),
J. Goebbels. 6 Feb 76, 64p
In German.
U.S. Sales Only.

The surface resistance of amorphous Ga and Sn layers of varying thickness have been measured with a further developed microwave cryostat. A two-layer model enabled thinner layers to be included in the evaluation. Deviations in the temperature course between theory and experiment in a narrow region imply a modified course of the energy gap depending on temperature. It is shown that one can achieve a good description of the experimentally found surface resistance using a free-electron model even for these amorphous metals. The free electron gas, as expected, proves to be less suitable in the crystalline state. (Atomindex citation 09:366795)

INIS-mf-4164 PC **A08**/MF **A01**
Bombay Univ. (India).
Thermoluminescence Studies of Natural and Doped Calcium Fluoride Phosphors.
Thesis,
M. A. El Kolaly. 1977, 172p
U.S. Sales Only.

The various aspects of thermoluminescence (TL) of calcium fluoride phosphors obtained both from natural and laboratory-grown CaF sub 2 crystals have been investigated in the temperature range from room temperature to 750 deg C. Dopants used in these studies were Mn, Y and lanthanide series rare earths. The aspects which have been investigated are as follows : (1) effect of single and double doping on TL glow curves and TL emission spectra after gamma irradiation, (2) TL traps : their kinetics including evaluation of the activation energy using different techniques, their decay kinetics and their behavior under partially filled conditions, and (3) effect of temperature on emission of intensity of X-ray induced luminescence and TL. During the course of these investigations, a new glow peak was observed at 650 deg C in natural CaF sub 2 . It was found that this peak could also be produced in synthetic CaF sub 2 doped with (Y + Sm). A new model for the TL trap has also been proposed. (Atomindex citation 09:375947)

INIS-mf-4394 PC **A05**/MF **A01**
Technische Hochschule, Darmstadt (Germany, F.R.). Fachbereich Physik.
Determination of Superlattice and Magnetic Structures in the System (Fe,MN)(Nb,Ta) sub 2 O sub 6 with Elastic Neutron Scattering Experiments.
S. Klein. 25 Jun 76, 86p
In German.Diss. (D.Sc.).
U.S. Sales Only.

The aim of this work was to study the magnetic structures of the trirutile FeTa sub 2 O sub 6 and the columbite MnTa sub 2 O sub 6 . A further question was the influence of the nonmagnetic positive ions on the developing magnetic structure. One example is the mixed-crystal series Mn(Nb,Ta) sub 2 O sub 6 . The different magnetic structures of FeNb sub 2 O sub 6 and MnNb sub 2 O sub 6 , having the same chemical structure, causes the existence of a transition region between these two magnetic structures. Neutron diffraction is a well-suited method to investigate the character of these concentration-dependent phase transitions. All experiments have been performed with elastic neutrons, and a new set-up for measurement of low temperatures has been used. For the evaluaion of these data two computer programs are developed. (Atomindex citation 09:399603)

INIS-mf-4716 PC **A07**/MF **A01**
Sao Paulo Univ., Sao Carlos (Brazil). Inst. de Fisica e Quimica.
Magneto-Optical Measurement of Spin-Lattice Relaxation Time in KBr and in the Na and Cs Halides and Co exp ++ Ion Magnetic Circular Dichroism Study in KCl.
R. A. Carvalho. 1977, 122p
In Portuguese.Tese (Ph.D.).
U.S. Sales Only.

A magnetic circular dicroism spectrometer is described, which was used in the following experiments: 1) The spin-lattice relaxation time (T sub 1) for F centers in NaCl, NaBr, CsBr and CsCl at 1.8 exp 0 K in magnetic fields up to 15000 Gs is described. The suitability of theory to explain the differences observed for halides of different alkali ions as well as for different structures proves that the hyperfine interaction is the most important mechanism for this kind of center. It is also verified that, for temperatures between 6 exp 0 K and 15 exp 0 K, T sub 1 experimental values fits the theory reasonably well, for F centers in KBr. The MCD spectra for KCl:Co exp ++ and CaF sub 2 :Co exp ++ in different magnetic fields up to 56 KGs and in the temperature range between 1.8 exp 0 K and 4.2 exp 0 K is obtained. The results are consistent with the assumption that Co exp ++ centers are interstitial in KCl lattice. (Atomindex citation 10:431383)

INIS-mf-4788 PC **A08**/MF **A01**
Technische Univ., Brunswick (Germany, F.R.). 1. Naturwissenschaftliche Fakultaet.
Behaviour of Neutrons Passing Through the Bloch Wall.
Habil. Schr,
O. Schaerpf. 1976, 146p
In German.
U.S. Sales Only.

In part I of the present paper the pertinent knowledge about Bloch walls is presented and developed insofar as it appears necessary for the experiments with neutrons, that is to say the direction of magnetization within the domains, the calculation of the variation of magnetization in the wall, the wall thickness, and the zigzag structure of the Bloch wall. In part II it is first clarified why the Bloch wall can be treated as a continuum problem. It shows that this is possible far away from Laue reflexes. For angles far away from Laure-reflex angles the interaction of the periodic structure of the magnetization can be described with the aid of an averaged magnetic flux density. The consequence of it is the possibility of treating the problem by means of a Schroedinger equation with continous interaction. This leads to a law of refraction. The question of the possibilities for explaining the intensity behavior is treated in part III. This part, from different aspects, describes the fact, which already was pointed out in Schaerpf, O., Vehoff, H., Schwink, Ch. 1973, that the spin of the neutrons in passing through the wall is partly taken along by the magnetization gradually rotating in the wall. (Atomindex citation 10:439036)

INIS-mf-4792 PC **A11**/MF **A01**
Akademiya Nauk SSSR, Moscow. Nauchnyi Sovet po Khimii Vysokikh Energii.
Radiation Physics and Chemistry of Ionic Crystals. I.
1978, 243p
U.S. Sales Only.

Separate abstracts have been prepared for items within the scope of the energy data base. (Atomindex citation 10:441541)

INIS-mf-4817 PC **A13**/MF **A01**
Akademiya Nauk SSSR, Moscow. Nauchnyi Sovet po Khimii Vysokikh Energii.
Radiation Physics and Chemistry of Ionic Crystals. II.
1978, 289p
U.S. Sales Only.

Separate abstracts have been prepared for items within the scope of the energy data base. (Atomindex citation 10:441307)

INIS-mf-4836 PC **A07**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
Some Neutron Scattering Studies on Magnetic and Molecular Phase Transitions.
Proefschrift (Dr.),
L. Bevaart. 12 Oct 78, 144p
U.S. Sales Only.

In this thesis neutron-scattering investigations on two different systems are described. The first study is concerned with the magnetic ordering phenomena in pseudo two-dimensional (d = 2), two-component antiferromagnets K sub 2 Mnsub(1-x)Msub(x)F sub 4 (M = Fe, Co), as a function of the composition x and temperature T. For one of the samples in this series, K sub 2 Musub(0.978)Fesub(0.022)F sub 4 , the influence of an external magnetic field on the ordering characteristics was studied in addition. The second study deals with the rotational motions of the NH sub 4+ groups in NH sub 4 ZnF sub 3 in relation with the structural phase transition at Tsub(c) = 115.1 K. The experimental techniques were chosen according to the requirements of each of these two subjects. The former study was carried out by observing the elastic magnetic neutron scattering with a double-axis diffractometer, whereas for the latter study time-of-flight (TOF) techniques were applied to observe the inelastic and quasi-elastic incoherent neutron scattering by

the protons of the rotating NH sub 4+ groups. (Atomindex citation 10:442551)

INIS-mf-5156 PC **A02**/MF **A01**
Technische Univ. Muenchen, Garching (Germany, F.R.). Reaktorstation.
Investigation of Nearly Perfect Magnetic Single Crystals by Means of Neutron Diffraction.
H. H. Schmidt, and K. Koenig. 1978, 10p CONF-7806168-26
International workshop on neutron interferometry, Grenoble, France, 5 Jun 1978.
U.S. Sales Only.

Results from some neutron diffraction experiments with crystals of DyFeO sub 3 are reported. Neutrons of appropriate wavelength (1.26 A) were reflected by a perfect Si crystal monochromator. In most experiments the wavelength used was 1.26 A, the second crystal was to be placed in two different positions, the distance between the first and second crystal being about 6 meters for position 2 and about 7 meters for position 1. Position 2 provided the possibility of applying a magnetic field to the 2 crystal. The intensities of the reflected and transmitted beams were measured by two water- and cadmium-shielded neutron detectors. The magnetic structure of DyFeO sub 3 leads to the fact, that there are two classes of Bragg reflection, namely one of pure nuclear and another of pure magnetic origin. (Atomindex citation 10:477940)

INIS-mf-5206 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Influence of Rare Earth Impurities on TL Characteristics.
K. S. V. Nambi. 1978, 12p
U.S. Sales Only.

Lanthanide rare earth (RE) activators are known to provide efficient radiative recombination centres in a variety of thermoluminescent (TL) phosphors. Considerable progress has been achieved in the recent past in understanding the basic mechanism underlying such efficient RE-induced TL activation. Some of the important results are reviewed here especially on RE doping in host lattices like CaF sub 2 , CaSO sub 4 , LiF and Li sub 2 B sub 4 O sub 7 . The latest findings on double RE doping in such phosphors are also presented. The relevance of the well known spectroscopic jargons like concentration quenching, resonance transfer and thermal quenching are brought out vis-a-vis the TL behaviour of the rare earth dopants. The occurrence of RE emissions in natural minerals of importance in TL dating are briefly discussed. (Atomindex citation 10:477923)

INIS-mf-5213 PC **A06**/MF **A01**
Technische Hogeschool, Eindhoven (Netherlands).
Elementary Magnetic Excitations in Ising-Like Systems. A Study of the Excitations in the Microwave and Far Infrared Region in RbFeCl sub 3 .2H sub 2 O.
Q. A. G. van Vlimmeren. 23 Mar 79, 110p
Thesis.
U.S. Sales Only.

The elementary magnetic excitations in Ising-like systems are introduced and the excitation energies of both the spin cluster excitations and spin cluster resonances for pseudo one-dimensional Ising systems are derived. Introducting the Ising Basis Function Method, also small deviations from the pure Ising model can be taken into account. After a description of the experimental methods, the crystallographic and magnetic structure of RbFeCl sub 3 .2H sub 2 O are given. From the bulk magnetic properties, like magnetization, specific heat and susceptibility, a rather complete model can be constructed which explains the magnetic behaviour of RbFeCl sub 3 .2H sub 2 O at low temperatures. (Atomindex citation 10:477950)

ISM-263 PC **A02**/MF **A01**
Neuchatel Univ. (Switzerland). Inst. de Physique.
Pinning Effects in Periodic Superconducting Structures.
P. Martinoli, and J. R. Clem. 1979, 10p CONF-791151-4
Contract W-7405-ENG-82
Inhomogeneous superconductors conference, Berkeley Springs, WV, USA, 1 Nov 1979.

Pinning effects in superconducting films with periodically varying thickness in one dimension are reviewed. Peak structures in the critical current vs magnetic field curves and Josephson-like quantum phenomena in the flux-flow regime are described with models based on the interaction of the vortex lattice with the periodic potential created by the thickness modulation. (ERA citation 05:017150)

Juel-1492 PC **A04**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung.
Determination of Compton Profiles on the Metal-Hydrogen Systems VH/sub X/, VD/sub X/, and PdH/sub X/.
R. Laesser. Feb 78, 66p
In German.Thesis.
U.S. Sales Only.

Compton profiles for polycrystalline PdH sub 0 . sub 72 , VD sub 0 . sub 77 , VH sub 0 . sub 71 , Pd and V have been determined by Compton scattering of 159-keV photons from a Te 123/sup m/ source. The difference profiles before and after hydrogen loading are compared to different models for the electronic structure of the hydrides. It is shown that the Compton profile is a sensitive test of the accuracy of various model wave functions for the hydrides. In both palladium- and vanadium-hydride (deuteride) the anionic model (where it is assumed that the hydrogen forms a negative ion H exp - in the hydride) does not describe the experimental results. The best agreement with the experimental data for PdH sub 0 . sub 72 , VD sub 0 . sub 77 and VH sub 0 . sub 71 is obtained for a model which is based on band structure calculations for these hydrides and which takes into account that hydrogen-palladium or hydrogen-vanadium bonding states are created below the Fermi level by the introduction of hydrogen in the host lattice. (Atomindex citation 10:424377)

Juel-1504 PC **A04**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung.
Theory of the Isotope Effect in Superconducting Compounds.
F. J. Culetto, and D. Rainer. May 78, 69p
U.S. Sales Only.

We present a theoretical analysis of the isotope effect on the superconducting transition temperature. Our method is to calculate via formal perturbation theory the response of the transition temperature to small changes of the masses of the various constituents of the compound. We discuss the relation between the isotope effect and various more fundamental parameters in strong coupling superconductors, such as mu * and alpha exp 2 F(omega). As illustrative examples, we consider the systems Pd-H(D) alloys and the binary Chevrel phase superconductor Mo sub 6 Se sub 8 , and show that analysis of the isotope effect can yield useful information concerning interaction mechanisms in these compounds. (Atomindex citation 10:424804)

KFKI-1977-56 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Ferromagnetic Nuclear Resonance Investigation of the Surface Magnetization in Iron Sheets.
L. Varga, and K. Tompa. Sep 77, 25p
U.S. Sales Only.

The role of the domain structure and domain properties in ferromagnetic nuclear resonance (FNR) experiments is reconsidered. Using the FNR signal intensity as a measure of surface domain wall volume, it is found that the behaviour of the surface magnetization differs from that of the bulk magnetization of iron sheets. Namely, a critical field below which the FNR signal remains unchanged is observed in the surface magnetization. This lag of surface domain wall annihilation is sensitive to the given surface conditions and in particular to the rolling deformation. Considering the small skin depth, FNR as a surface testing method is discussed. (Atomindex citation 10:434487)

KFKI-1977-60 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Multiphoton Phenomena in Photoelectron Emission Processes of Metals at High Laser Intensities.
Gy. Farkas. Aug 77, 25p CONF-770653-4
International conference on multiphoton processes, Rochester, NY, USA, 6 Jun 1977.
U.S. Sales Only.

The surface multiphoton photoelectric effect of metals has proved to be a useful experimental method for investigations into the general laws governing multiphoton processes. A brief historical background is given. The more recent developments, namely the behaviour of the intensity dependence of the surface photoeffect at high laser intensities the multiphoton resonance in the case of metals, and the energy absorption from the laser beam by the already emitted "free" electrons are discussed. (Atomindex citation 10:434405)

KFKI-1977-96 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Heavy Ion Source with Indirect Heating.
E. Pasztor, L. Kiralyhidi, and P. Riedl. Nov 77, 11p
U.S. Sales Only.

A long-lifetime heavy ion source with indirect heating was constructed for an implanter. The ion current produced by the source is 1-2 mA. The indirect heating enables the stabilization of the discharge working in the arc region. The emittance was measured in the xz and yz planes at 30 kV extraction voltage. The beam is practically parallel in the y plane and slightly diverging in the x plane. The source was working more than 100 hours without any change in the emission or in other parameters. (Atomindex citation 10:438263)

LA-UR-80-108 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Short-Pulse CO sub 2 -Laser Damage Studies of NaCl and KCl Windows.
B. E. Newnam, A. V. Nowak, and D. H. Gill.
1979, 22p CONF-7910101-2
Contract W-7405-ENG-36
Symposium on optical materials for high power lasers, Boulder, CO, USA, 30 Oct 1979.

The damage resistance of bare surfaces and the bulk interior of NaCl and KCl windows was measured with a short-pulse CO sub 2 laser at 10.6 mu m. Parametric studies with 1.7-ns pulses indicated that adsorbed water was probably the limiting agent on surface thresholds in agreement with previous studies at long pulsewidths. Rear-surface thresholds up to 7 J/cm exp 2 were measured for polished NaCl windows, whereas KCl surfaces damaged at approximately 60% of this level. The breakdown electric-field thresholds of exit surfaces were only 50% of the value of the bulk materials. The pulsewidth dependence of surface damage from 1 to 65 ns, in terms of incident laser fluence, increased as t/sup 1/3/. (ERA citation 05:014027)

NORDITA-77/29 PC **A02**/MF **A01**
Nordisk Inst. for Teoretisk Atomfysik, Copenhagen (Denmark).
Fluctuation-Induced First Order Phase Transitions Studied by the Monte Carlo Technique.
O. G. Mouritsen, S. J. Knak Jensen, and P. Bak.
Jun 77, 10p
U.S. Sales Only.

The critical behavior of a three dimensional antiferromagnet described by a six dimensional order parameter has been investigated by the Monte Carlo technique. A first order phase transition is observed. This result is in agreement with the prediction of renormalization group calculations in 4-epsilon dimensions and with neutron scattering experiments on UO sub 2 , but in contrast to the mean field theory, which leads to a second order phase transition. (Atomindex citation 10:424394)

N80-21527/0 PC **A05**/MF **A01**
European Space Agency, Paris (France).
Ordering Effects in Transition Metal Alloys in Relation to Their Electronic Structure.
G. Treglia. Jan 80, 96p ESA-TT-600, ONERA-NT-1978-9
Transl. Into English of "Effets d'Order dans les Alliages de Metaux de Transition en Relation Avec

Leur Structure Electronique", Rept. Onera-NT-1978-9 Onera, Paris. Original Report in French Previously Announced as N80-17215.

The ordering energy in transition metal alloys, unlike the cohesive energy, can be written as the sum of effective pair interactions. These interactions are defined here in terms of quantities calculated from the electronic structure of these metals. Two methods can be used. In the first ('annealed' alloy), the susceptibility chi sub q is obtained by means of a molecular field method using an extremization of the free energy, and the interaction identified by analogy with the Ising model. The best thermodynamic one-site approximation is found to be the coherent potential approximation (CPA). In the second method ('frozen' alloy), the ordering energy is given by a generalized perturbation method taking as reference state the completely disordered state treated within the usual CPA. These two methods lead to the same concentration-dependent effective pair interactions. This is true even if charge transfers are taken into account. A detailed numerical discussion shows the validity range of the model to be the same as that of CPA.

N80-21673/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
InP and GaAs Characterization with Variable Stoichiometry Obtained by Molecular Spray.
Final Report.
J. Massies, N. T. Linh, J. Olivier, P. Faulconnier, and R. Poirier. Dec 79, 31p NASA-TM-75748, LCR-2270-DK
Contract NASW-3199
Transl. Into English of "Etude de Surfaces de Phosphure d'Indium Obtenues Sous Differentes Stoichiometries Par la Technique des Jets Moleculaires. Application a la Realisation de Barrieres de Schottky", Rept. Lcr-2270-Dk Lab. De Central de Rech. Thomson-CSF, Orsay, France, Aug. 1977 31 p. Original Language Document Was Announced as N79-27414.

Both InP and GaAs surfaces were studied in parallel. A molecular spray technique was used to obtain two semiconductor surfaces with different superficial compositions. The structures of these surfaces were examined by electron diffraction. Electron energy loss was measured spectroscopically in order to determine surface electrical characteristics. The results are used to support conclusions relative to the role of surface composition in establishing a Schottky barrier effect in semiconductor devices.

N80-21775/5 PC **A02**/MF **A01**
California Univ., Los Angeles. School of Engineering and Applied Science.
X-Ray Measurements of Stresses and Defects in EFG and Large Grained Polycrystalline Silicon Ribbons.
Final Report.
C. N. J. Wagner. Aug 79, 22p NASA-CR-162629, JPL-9950-315
Prepared for JPL and Doe Sponsored by NASA.

The Bond method was employed to measure the lattice parameter in an area of 0.4 mm in diameter of EFG Si-ribbons to an accuracy of + or - 0.00008 A. A Bond goniometer was built which included a goniostat with a special specimen holder to mount ribbons 1 m in length and 75 mm in width which could be rotated about two orthogonal axes, and a Leitz microscope for precision alignment of a particular area into the center of the goniostat and the small primary X-ray beam. The (321) planes were found to be parallel to the surface of the ribbons with an angular spread of about 15 deg. The poles of the (111) planes clustered about an angle of 25 deg away from the surface normal, again with a spread of 10 deg. The lattice parameter of a small piece of ribbon material was found to be a sub o = 5.43075 A. A maximum stress of 115 MPa was observed in a fractured ribbon which corresponded to the fracture stress of single crystals of Si.

N80-22091/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Secondary Electron Emission from Sodium Chloride, Glass and Aluminum Oxide at Various Temperature.
A. R. Shulman, V. L. Makedonskiy, and I. D. Yaroshetskiy. Jan 80, 18p NASA-TM-75754
Contract NASW-3198
Transl. Into English from Zh. Tekh. Fiz. (USSR), V. 23, 1953 p 1152-1160. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The method of single impulses was used to measure the coefficients of the secondary electronic emission for 2 types of Al2O2, monocrystalline NaCl and glass at different temperatures and for different values of the energy of the primary electrons. The value of the secondary electron emission does not depend upon temperature. The effect of a gas film on the value of the secondary electron emission was detected.

N80-22115/3 PC **A04**/MF **A01**
Battelle Inst., Frankfurt am Main (Germany, F.R.).
Study on Material Development for Ge:Be Infrared Detectors.
Final Report.
U. Brunsmann, J. U. Fischbach, and H. Egle. Jul 79, 57p BF-R-63.774-1, ESA-CR(P)-1248
Contract ESTEC-3604/78-NL-PP(SC)
Original Contains Color Illustrations.

A special crystal growth apparatus, which allows the contamination of crystal with oxygen to be controlled was constructed and tested. The aim was the development of A technique for doping Ge-crystals with the beryllium needed for radiation detectors in the 20-50 micrometer wavelength region. A suitable and reliable doping method was elaborated. Several undoped and doped crystals were grown in a vacuum. The resulting material was evaluated with respect to the oxygen content, content of electrically active impurities, electrically and optically active Be content and the doping profile. The results show that the oxygen content of the host crystal is below 3 x 10 to the 14th power per cubic cm, while the Be contents higher than 10 to the 15th power are achieved having smooth doping profiles. Detectivity measurements performed on some preliminary sample detectors at 52 micrometers and 10 Hz yield 9 x 10 to the 10th power (cm x Hz to 0.5 power)/ watt at a background photon flux density of 1.5 x 10 to the 12th power photons per sq cm per sec.

PB80-174048 PC **A11**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
NBS Reactor: Summary of Activities July 1978 to June 1979.
Final rept.,
Frederick J. Shorten. Apr 80, 238p NBS-TN-1117

This report summarizes all those programs which depend on the NBS reactor. It covers the period from July 1978 through June 1979. The programs range from the use of neutron beams to study the structure and dynamics of materials through nuclear physics and neutron standards to sample irradiations for activation analysis, isotope production, radiation effects studies, neutron radiography, and nondestructive evaluations.

PB80-175417 PC **A03**/MF **A01**
National Bureau of Standards, Boulder, CO. National Engineering Lab.
Development of Standards for Superconductors.
Annual rept. for FY 1979,
F. R. Frickett, and A. F. Clark. Dec 79, 46p NBSIR-80-1629
Contracts DE-PR01-79ET52052, DE-PR02-79ET26603
Sponsored in part by Massachusetts Inst. of Tech., Cambridge.

Practical superconductors are complex materials and the determination of the parameters required for designing with them is a difficult task. Many approaches are possible for determining a given parameter and the results depend critically on which one is chosen. The goal of this program is to arrive at a set of useful voluntary standards for measurements on modern practical superconductors that will be acceptable to both manufacturers and users. Agreement on a set of standard definitions for the various parameters is also necessary. This report describes the status of the program and includes a brief historical introduction. The need for standards in this area is described in detail with particular attention paid to the need for consensus among all interested parties and the techniques for achieving it. Results from the experimental research by NBS and a review of the wire manufacturers' programs are presented.

PB80-810443 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cobalt Rare Earth Permanent Magnets. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Brian Carrigan. May 80, 167p
Supersedes NTIS/PS-79/0527 and NTIS/PS-78/0518. For the companion Published Searches of the Engineering Index Data Base, see PB80-810450 and PB80-810468.

Federally-funded research on fabrication, crystal growth, crystal structure, defects, tests, measurement, and magnetic and thermal properties are cited. Studies on phase transformations, intermetallic compounds, magnetication, anisotropy, surface properties, performance, and applications are included. (This updated bibliography contains 162 abstracts, 11 of which are new entries to the previous.)

PB80-810450 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cobalt Rare Earth Permanent Magnets. 1970-May, 1979 (Citations from the Engineering Index Data Base).
Rept. for 1970-May 79,
Brian Carrigan. May 80, 262p
For the companion Published Search of the NTIS Data Base, see PB80-810443.

Research summaries from worldwide journals on fabrication, composition, bonding, sintering, pressing, and processing of these magnets are presented. Studies on phase transformations, microstructure, intermetallic compounds, anisotropy, and applications are covered. (This updated bibliography contains 256 abstracts, none of which are new entries to the previous edition.)

PB80-810468 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cobalt Rare Earth Permanent Magnets. June, 1979-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jun 79-Apr 80,
Brian Carrigan. May 80, 100p
Supersedes NTIS/PS-79/0528 and NTIS/PS-78/0519. For the companion Published Search of the NTIS Data Base, see PB80-810443. See also, 1970-May, 1979, PB80-810450.

Research summaries from worldwide journals on fabrication, composition, bonding, sintering, pressing, and processing of these magnets are presented. Studies on phase transformations, microstructure, intermetallic compounds, anisotropy and applications are covered. (This updated bibliography contains 95 abstracts, all of which are new entries to the previous edition.)

RISOE-R-393 PC **A07**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Physics Department Annual Progress Report, 1 January-31 December 1978.
H. B. Moller, and B. Lebech. Dec 78, 133p
U.S. Sales Only.

Research in the Physics Department at Riso covers three main fields: Solid-state physics, Plasma physics, Meteorology. The principal activities in these fields are presented in this report that covers the period from 1 January to 31 December 1978. (Atomindex citation 10:492382)

UCRL-Trans-11537 PC **A02**/MF **A01**
Band Structure of the Crystals BP and BAs and Their Mutual Solid Solutions.
V. T. Sharai. 1976, 4p
Contract W-7405-ENG-48
A. Vopr. Fiz. Elektron. Tekhnol. Tverd. Tel. P11-12 1976.

The band structures of the BP and BAs crystals were calculated using the method of bonding orbitals and x-ray spectra data. This calculation agrees with the more reliable theoretical calculations. (ERA citation 05:016228)

20M. Thermodynamics

LA-8111 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
4 K to 20 K Rotational-Cooling Magnetic Refrigerator Capable of 1-MW to > 1-W Operation.
J. A. Barclay. Feb 80, 10p
Contract W-7405-ENG-36

The low-temperature, magnetic entropy of certain single-crystal paramagnetic materials, such as DyPO sub 4 , changes dramatically as the crystal rotates in a magnetic field. A new magnetic refrigerator design based on the anisotropic nature of such materials is presented. The key advantages of the rotational-cooling concept are (1) a single, rotary motion is required, (2) magnetic field shaping is not a problem because the entire working material is in a constant field, and (3) the refrigerator can be smaller than comparable magnetic refrigerators because the working material is entirely inside the magnet at all times. The main disadvantage of the rotational-cooling concept is that small-dimension single crystals are required. (ERA citation 05:014017)

20N. Wave Propagation

AD-A083 097/6 PC **A08**/MF **A01**
California Univ San Deigo La Jolla Dept of Electrical Engineering and Computer Sciences
A Simplified Theory of ELF Propagation in the Earth-Ionosphere Transmission Line and Its Worldwide Application.
Final rept. 1 Aug 78-31 Mar 80,
Henry G. Booker. 31 Mar 80, 172p
Contract N00014-78-C-0682

An approximate theory of ELF propagation in the Earth-ionosphere transmission line is developed by combining the reflection theory of Booker and Lefeuvre (1977) with Greifinger and Greifinger's treatment 81978, 1979) of the effect of ionization below the level of reflection. The theory allows for the influence of the Earth's magnetic field, for reflection from the gradient on the under side of the D region (or, at night, of a ledge below the E region), for reflection from the gradient on the under side of the E region, and for reflection from the gradient on the top side of the E region. The procedure is to compare local vertical gradient with local wavelength, thereby classifying altitude into intervals where the gradient is high and ones where it is low. Where the gradient is low, the phase-integral treatment is adequate. An interval where the gradient is high may, to a first approximation, be replaced by a discontinuity. The amount of the discontinuity is the difference between the refractive indices at the top and bottom of the interval of high gradient, judged in relation to local wavelength. It is then a matter of combining reflections from the several discontinuities. This requires calculation of the complex phase-changes between the discontinuities. But these are the intervals where the phase-integral treatment is available. To a better approximation, there is a non-zero phase-change associated with an interval of high gradient. The method for incorporating this is described.

AD-A083 156/0 PC **A02**/MF **A01**
Naval Environmental Prediction Research Facility Monterey CA
Anomalous Microwave Propagation Assessment in the Lower Troposphere Using a Bulk Meteorological Parameter.
Final rept.,
Wayne Sweet. Feb 80, 24p Rept no. NEPRF-TR-80-01

In their 1967 study 'On the Influence of the Meteorological Conditions on the Radiation Properties of Long Range Radars and on the Field Strength From a Distant Radio Transmitter,' Gjessing and Moene (G&M) developed a procedure which uses a delta N parameter evaluated at the 850 mb level to assess the propagation properties for microwave transmissions. This present study examines the skill of the G&M procedure to determine resulting accuracy, optimum value of delta N, and preferred vertical region of assessment. EASTPAC radiosonde soundings are used to determine the refractive structure in the given vertical region, and to calculate the value of delta N (850 mb). The G&M procedure's skill is found to be comparable to, or in some cases better than, the skill of present day weather forecasts. The G&M procedure is found to have skill in assessing the existence of anomalous propagation between the surface and the 850 mb level with no indication to the vertical location within this region. The optimum value of delta N is found to be similar to that used by Gjessing and Moene. (Author)

AD-A083 240/2 MF **A01**
Rome Air Development Center Griffiss AFB NY
VLF/LF Reflectivity of the Polar Ionosphere, 31 December 1978 - 5 May 1979,
Robert P. Pagliarulo, John P. Turtle, John E. Rasmussen, Robert L. Cooley, and Wayne I. Klemetti. Oct 79, 87p Rept no. RADC-TR-79-273
Availability: Microfiche copies only.

This report provides a summary of high latitude ionospheric reflectivity as observed by the USAF high resolution VLF/LF ionosounder operating in northern Greenland. Ionospheric reflectivity parameters, including reflection heights and coefficients, are presented as a function of time of day. VLF long path propagation measurements, along with magnetometer and riometer data, are presented as supplementary data. (Author)

AD-A083 331/9 PC **A03**/MF **A01**
Utah State Univ Logan Space Measurements Lab
Development of a Small Rocket System for Conductivity Measurements in the High Latitude Disturbed D-Region in Support of ELF/VLF Propagation Studies.
Final rept. 9 Oct 78-20 Jun 79,
D. A. Burt, E. F. Pound, and G. D. Allred. 30 Jun 79, 28p DNA-5039F, AD-E300 715
Contract DNA001-78-C-0342

An ultra-miniature conductivity probe for small rocket applications has been developed for measurements within the lower atmosphere (D-region and below). The probe is contained within a MET rocket and may be launched from standard MET sites with a minimum of personnel and equipment. The measuring instrument is a miniature Gerdien condenser, which is ejected near apogee and is trailed by a starute to reduce descent speeds below sonic values. Accumulated data are transmitted via telemetry to a recording ground station. The initial application of this instrument was at the White Sands Small Missile Range on 14 December 1978. After payload ejection near apogee data were recorded for over an hour as the instrument descended on the starute. Some modifications are indicated, but basically the concept and experiment appear sound.

AD-A083 341/8 PC **A04**/MF **A01**
Mission Research Corp Santa Barbara CA
Evaluation of an Ambient HF Sky-Wave Propagation Model.
Topical rept. 1 Nov 77-31 Oct 78,
W. A. Schlueter. 1 Nov 78, 63p MRC-R-418, DNA-4780T, AD-E300 710
Contract DNA001-78-C-0237

The ambient sky-wave propagation model in the HFNET computer program is evaluated by comparing predicted results with those from the widely used HFMUFES4 computer program and data from mid-latitude and auroral region propagation paths. The HFNET propagation model consists of two parts - a geometrical model and an ionospheric parameter model. The HFNET geometrical model uses the virtual height technique with corrections made for ionospheric tilts in and perpendicular to the great circle plane. Good agreement between results from HFNET and HFMUFES4 was obtained when the same ionospheric parameters (for a horizontally uniform ionosphere) were used in both programs. Comparison of program results with data from a 3,260 km mid-latitude propagation path showed good agreement, thereby establishing the validity of the geometrical model. HFNET predictions were seen to depend upon models of ionospheric parameters. This dependence, of course, applies to all models of sky-wave propagation. HFNET allows the user to select one of two ionospheric models of median characteristics. One model is global in nature while the second model applies only to latitudes greater than about 45 degrees. Comparison of HFNET results using the global model with data from the mid-latitude path shows that the predicted MUF is 5 percent to 20 percent below the average of daily values obtained over a month's time. However, the HFNET values are within the wide range of observed daily variability. For frequencies below the MUF, those generally used so as to avoid the problems associated with operating near the highly variable MUF, predicted and measured characteristics such as elevation angle and mode type are in good agreement.

AD-A083 451/5 PC **A03**/MF **A01**
Sri International Menlo Park CA
Medium Frequency Propagation Experiment at MISERS BLUFF.
Topical rept. 15 Jul-15 Nov 78,
Roger S. Vickers. 15 Nov 78, 34p DNA-4806T-1, AD-E300 731
Contract DNA001-77-C-0269

In an experiment conducted in conjunction with the MISERS BLUFF high-explosive detonation, the effects of the dust cloud on wave propagation at 3 MHz were assessed. The experiment used both vertical above-ground and horizontal buried antennas. The results indicate that the dust from this 720-ton ANFO detonation caused no appreciable propagation effects, as expected, although the shock wave perturbed communications for several seconds.

AD-A083 519/9 PC **A04**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Development of an X-Ray Transport Model Based on Peierls' Integral Equation.
Master's thesis,
Robert P. Dickey. Mar 80, 59p Rept no. AFIT/GNE/PH/80M-1

An X-ray transport model is developed which gives the streaming radiation flux, thermal radiation flux, and material energy of air, as a function of position and time, following the release of a large amount of x-ray energy in the atmosphere. The model is intended as a compromise between the simple diffusion theory models and the accurate transport theory models. It applies to the radiative growth which takes place at early times before hydrodynamic motion begins. The model assumes that air is heated by photoelectric absorptions to a burnout temperature, the kinetic temperature at which the air molecules are completely ionized. The opacity of air is assumed very large at temperatures below the burnout temperature and very small at temperatures above the burnout temperature. Peierls' integral equation is used to calculate the flux of thermal radiation which builds up in the burned-out air. The integral equation considers both the non-local and retarded time-dependent characteristics of the radiation field. An efficient numerical solution to the model is greatly complicated due to the inverse cubic temperature dependence of the opacity and the retarded time dependence of the thermal radiation field. A numerical algorithm is presented for solving the model. (Author)

AD-A083 594/2 PC **A02**/MF **A01**
Harvard Univ Cambridge MA Gordon McKay Lab
Current Induced on Single and Crossed Electrically Short and Thin Tubular Cylinders by a Normally Incident Plane Electromagnetic Wave,
Ronold W. P. King, Dennis J. Bleier, and Barbara H. Sandler. 3 Mar 78, 13p AFOSR-TR-80-0291
Contract N00014-75-C-0648, Grant AFOSR-76-3073
Pub. in IEEE Transactions on Antennas and Propagation, vAP-27 n5 p624-634 Sep 79.

No abstract available.

KFK-2788 PC **A06**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Three-Dimensional Imaging of gamma -Source Distributions with Fresnel Zone Plates.
G. Eck, and H. Bluhm. Apr 79, 101p
In German.
U.S. Sales Only.

The present paper investigates the ability of circular and linear Fresnel zone plates to image point-

and pinlike gamma -sources with fission spectrum energies. Using the Fresnel-Kirchhoff diffraction theory resolution, depth of field and field of view as well as point response functions have been recalculated for different numbers of zones and different central radii. Also the influence of higher terms in the exponential expansion of the zone plate aperture has been determined. To carry out experimental investigations a zone plate camera consisting of an X-ray film cassette and circular W or linear Pb zone plates on an Al support has been built. The codes images were decoded with the help of an analog optical reconstruction system containing a He-Neiaser. Different spatially distributed source configurations have been simulated using a Cf-252 point source and an Sb-124 pin source. The analogue reconstruction of the coded images succeeded in reproducing the original geometrical source configurations with satisfactory accuracy. In addition it was possible to determine the relative source intensities correctly and a quadratic connection between source and image intensities, confirmed by theory, has been found. (Atomindex citation 10:476832)

N80-21625/2 PC **A04**/MF **A01**
George Washington Univ., Washington, DC. Dept. of Electrical Engineering and Computer Science.
Electromagnetic Backscattering from a Random Distribution of Lossy Dielectric Scatterers.
Final Report.
R. H. Lang. Apr 80, 54p NASA-CR-162922
Grant NSG-5288

Electromagnetic backscattering from a sparse distribution of discrete lossy dielectric scatterers occupying a region 5 was studied. The scatterers are assumed to have random position and orientation. Scattered fields are calculated by first finding the mean field and then by using it to define an equivalent medium within the volume 5. The scatterers are then viewed as being embedded in the equivalent medium; the distorted Born approximation is then used to find the scattered fields. This technique represents an improvement over the standard Born approximation since it takes into account the attenuation of the incident and scattered waves in the equivalent medium. The method is used to model a leaf canopy when the leaves are modeled by lossy dielectric discs.

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A083 546/2 PC **A03**/MF **A01**
Cornell Univ Ithaca NY Dept of Theoretical and Applied Mechanics
Mathematical Theory of Laminar Combustion. VII. Cylindrical and Spherical Premixed Flames.
Technical rept.,
J. D. Buckmaster, and G. S. S. Ludford. Mar 80, 32p TR-109, ARO-15882.13-M
Contract DAAG29-79-C-0121
See also Chapter 9, AD-A083 547.

This report is Chapter VII of the twelve in a forthcoming research monograph on the mathematical theory of laminar combustion. Cylindrical and spherical premixed flames are discussed, the latter with a view to application to the burning monopropellant drop. Cylindrical flames have a planar character, while spherical flames exhibit ignition and extinction. (Author)

AD-A083 547/0 PC **A03**/MF **A01**
Cornell Univ Ithaca NY Dept of Theoretical and Applied Mechanics
Mathematical Theory of Laminar Combustion. IX. Burner Flames.
Technical rept.,
J. D. Buckmaster, and G. S. S. Ludford. Mar 80, 36p TR-111, ARO-15882.14-M
Contract DAAG29-79-C-0121
See also Chapter 11, AD-A083 548.

This report is Chapter IX of the twelve in a forthcoming research monograph on the mathematical theory of laminar combustion. The three parts of a burner flame (namely base, cone and tip) are examined using both the slowly varying and near-equidiffusional theories of Chapter VIII. (Author)

AD-A083 548/8 PC **A04**/MF **A01**
Cornell Univ Ithaca NY Dept of Theoretical and Applied Mechanics
Mathematical Theory of Laminar Combustion. XI. Stability.
Technical rept.,
J. D. Buckmaster, and G. S. S. Ludford. Mar 80, 51p TR-113, ARO-15882.15-M
Contract DAAG29-79-C-0121
See also Chapter 12, AD-A083 549.

This report is Chapter XI of the twelve in a forthcoming research monograph on the mathematical theory of laminar combustion. The investigation is narrowed to the stability of freely propagating premixed flames, the only area that has yielded to mathematical analysis so far. Special emphasis is placed on the cellular flames that are found experimentally to be the result of instability. (Author)

AD-A083 549/6 PC **A04**/MF **A01**
Cornell Univ Ithaca NY Dept of Theoretical and Applied Mechanics
Mathematical Theory of Laminar Combustion. XII. Ignition and Explosion.
Technical rept.,
J. D. Buckmaster, and G. S. S. Ludford. Mar 80, 52p TR-114, ARO-15882.16-M
Contract DAAG29-79-C-0121
See also Chapter I, AD-A049 382.

This report is Chapter XII of the twelve in a forthcoming research monograph on the mathematical theory of laminar combustion. The induction, explosion, transition, propagation and relaxation phases are described for a slab of reactant whose faces are kept at a constant temperature. Under ignition, the application of a heat flux to a half space is considered. Finally, the explosion of initially separated reactants after they have mixed is shown to be very similar to the explosion of premixed reactants. (Author)

ANL/CEN/FE-79-8 PC **A03**/MF **A01**
Argonne National Lab., IL.
Support Studies in Fluidized-Bed Combustion. Quarterly Report, April-June 1979.
I. Johnson, J. F. Lenc, J. A. Shearer, G. W. Smith, and W. M. Swift. 1979, 42p
Contract W-31-109-ENG-38

This work supports the development studies for atmospheric and pressurized fluidized-bed coal combustion. Laboratory and process development studies are aimed at providing needed information on limestone utilization, removal of particulates and alkali metal compounds from the flue gas control of SO sub 2 and trace pollutant emissions, and other aspects of fluidized-bed coal combustion. This report presents information on: (1) the removal of particulate emissions from pressurized fluidized-bed combustion flue gas using a commercially available high-efficiency cyclone (TAN-JET), and (2) the results of laboratory and process development unit studies to determine the effects of CaCl sub 2 , Na sub 2 CO sub 3 , NaCl, and H sub 2 O treatments on increasing the utilization of limestone. (ERA citation 05:014748)

21C. Electric Propulsion

N80-22061/9 PC **A05**/MF **A01**
United Kingdom Atomic Energy Authority, Culham (England). Engineering Design Div.
Ion Optics Studies for a Field Emission Thruster.
Final Report.
P. F. Little, and C. L. Thomas. Aug 77, 86p CLM/RR/E1/24
Contract ESTEC-2336/74-AK

A computational study of the ion trajectories in a field emission thruster is presented. An electrode system for accelerating Cs ions emitted from a linear array of points was designed in such a way as to produce a collimated beam with a minimum number of ions striking the electrodes. The electric field distribution around a finite array of pin emitters was calculated for arrays containing different numbers of emitters. This electrostatic problem was solved in three dimensions. A modified support structure was formulated in which end effects due to finite length were negligibly small. The trajectories of ions emitted from single pin emitter and from a sharp edge (a line source) were also traced through a system of electrodes as two-dimensional problems. The edge emitter is treated as if of infinite length, end effects being ignored. A two-dimensional electrode configuration is suggested in which back-bombardment of the is predicted to be negligible.

21D. Fuels

AD-A083 301/2 PC **A03**/MF **A01**
Army Mobility Equipment Research and Development Command Fort Belvoir VA
Evaluation of the Effects of ASA-3 on the Performance of Military Standard Filter/Coalescer Elements.
Final technical rept. Sep-Oct 78,
Ralph J. Polk, Jr., and William R. Williams. Feb 80, 42p Rept no. MERADCOM-2290

This report covers decontamination tests conducted on military standard filter/coalescer elements using JP-4 and JP-5 turbine fuels with and without antistatic additive ASA-3. During the tests, JP-5 with ASA-3 degraded filter/coalescer element performance. (Author)

AD-A083 317/8 PC **A05**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Densified Biomass as an Alternative Army Heating and Power Plant Fuel.
Final rept.,
S. A. Hathaway, J. S. Lin, D. Mahon, T. Magrino, and K. Duster. Mar 80, 87p Rept no. CERL-TR-E-158

This investigation evaluated the technical and economic potential of using densified biomass (principally wood pellets) as a coal substitute in Army heating and power plants. The report reviews Department of Defense (DOD) experience with and tests of wood pellets; production of wood pellets (excluding silvicultural aspects); handling, storing, and feeding; combustion; major environmental considerations; and economics of use.

AD-A083 364/0 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Assumptions in Analizing the Self-Ignition Process of Shattered Fuel Drops in a Hot Oxidizer,
Piotr Wolanski. 29 Jun 79, 13p Rept no. FTD-ID(RS)T-0813-79
Edited trans. of Archiwum Termodynamiki i Spalania, Polska Akademia, Komitet Termodynamiki i s Palania (Poland) v8 n2 p297-301 1977, by F. Zaleski.

No abstract available.

AD-A083 610/6 PC **A07**/MF **A01**
Southwest Research Inst San Antonio TX Army Fuels and Lubricants Research Lab
Development of Army Fire-Resistant Diesel Fuel.
Interim rept. 1 Oct 77-31 Dec 79,
W. D. Weatherford, Jr., G. E. Fodor, D. W. Naegeli, E. C. Owens, and B. R. Wright. Dec 79, 132p Rept no. AFLRL-111
Contracts DAAK70-78-C-0001, DAAK70-80-C-0001

Six different approaches to achieving reduced fuel fire vulnerability investigated by the U.S. Army have been described. The last approach was selected for developing fire-resistant fuels (FRF) for diesel-powered ground equipment. The selected approach involves the inclusion of emulsified water in surfactant-stabilized diesel fuel. An alternative approach, using half as much water and trace amounts of antimist agent in surfactant-stabilized diesel fuel, also has been investigated. Screening studies followed by laboratory, bench-scale, and full-scale experimental investigations have led to the development of clear-to-hazy fire-resistant microemulsions of 10 percent volume water and 6 percent volume surfactant (FRF-A) and alternatively, of 5 percent volume water and 3 percent volume surfactant with 0.2 wt% antimist agent (FRF-B), both formulated in DF-2 diesel fuel. The surfactant comprises a mixture of reaction products formed from two moles of diethanolamine and mole of oleic acid, or 1.009 moles of

oleic acid in a modified version of the surfactant. Flammability evaluations demonstrate that these aqueous microemulsions yield diminished mist flammability while either eliminating pool burning or providing rapid self-extinguishment of pool fires, even at fuel temperatures more than 10 degrees C above the base fuel flash point. Bench-scale ballistic tests, using 20-mm high-explosive incendiary tracer projectiles, and full-scale ballistic tests, using 3.2-inch precision shaped charges, confirm and correlate with the flammability data.

DOE/AL/11768-T1 PC **A06**/MF **A01**
Texas Energy and Natural Resources Advisory Council, Austin.
Report of the Advisory Committee on Agriculturally Derived Fuels to the Texas Energy and Natural Resources Advisory Council.
3 Sep 79, 110p
Contract FG04-79AL11768

For the purpose of the Committee, biomass was defined as the volume of living material or residues of living material (organic material) available in Texas for conversion into energy. Statistical reports from the Texas Agricultural Experiment Station and other sources indicate that in addition to surplus and distressed grains and certain other crops, there are roughly 27 million tons of agricultural residues currently being left in the fields or at the processing plants after harvest. The average annual residue from five crops - sorghum, corn, wheat, rice and cotton - is more than 20 million tons with a theoretical heat value of 270 trillion Btus. This represents 64 percent of the total energy input for Texas agriculture in 1973. Additionally, 4.1 million tons of dry manure is economically recoverable from Texas feedlots which could be converted into 14 trillion Btus of energy each year in the form of methane gas. Municipal solid waste, much of which is comprised of residues of living materials, currently amounts to about 13 million tons annually. The principal processes for converting the referenced resources into energy include: (1) direct combustion; (2) fermentation; (3) gasification/pyrolysis; (4) anaerobic digestion; and (5) petroculture - the production of certain non-traditional plants. Texas produces huge quantities of biomass, and has the potential of producing even more, which can be converted through various processes into significant quantities of usable energy to help meet the needs of the agricultural industry and the general public. Some of the technology required for the conversion processes is already sufficiently advanced to support immediate production and use while others will require additional research and development. The report discusses the current level of development of the relevant technologies. (ERA citation 05:011577)

DOE/FE-2652 PC **A03**/MF **A01**
Pope, Evans and Robbins, Inc., New York.
Prototype Anthracite Culm Combustion Boiler/Heater Unit. Quarterly Technical Report No. 4, July 1-September 30, 1979.
Jan 80, 43p
Contract ET-78-C-01-2652

There are currently about 910 million cubic yards of anthracite culm (mine refuse) contained in 800 separate banks in a 480 square mile area in the Wilkes-Barre (W-B) anthracite mining region. Although this material represents a significant fuel value, equivalent to approximately 1.25 billion barrels of fuel oil, the culm banks have accumulated because no satisfactory method of combusting this fuel was available until the relatively recent development of the atmospheric fluidized bed (AFB) steam generator. A program was initiated in October 1978 to design, construct and evaluate a 100,000 pph AFB steam generator burning anthracite culm with the addition of fresh anthracite, if required. The unit is to demonstrate the technical, economical and environmental feasibility of producing 150 psig saturated steam for district heating in downtown W-B. Phase I of the program consists of the design of the atmospheric fluidized bed (AFB) plant and a hot model test program. Phase II of the program consists of construction, operation, testing and evaluation of the boiler and boiler plant. (ERA citation 05:013033)

EUR-5937 PC **A03**/MF **A01**
Commission of the European Communities, Petten (Netherlands). Joint Nuclear Research Center.
Evaluation of Some Standard Methods for the Determination of Aromatic and Non-Aromatic Content in High Boiling Mineral Oils.
W. Karcher, P. Glaude, E. Nagy, and J. van Eijk. 1978, 42p
U.S. Sales Only.

For the determination of aromatic content in high boiling mineral oils for tarification purposes three standardized methods, based on elution chromatography (ASTM-D 2549, GUD, DIN 51 384) have been evaluated on a range of industrial products. Special emphasis has been given in this context to reproducibility and repeatability criteria. From the experimental values obtained in this investigation it can be concluded that in general the three methods tend to yield reproducible results. With regard to standard deviation and confidence limits, the best results have consistently been obtained with the DIN method. Taking into account other advantages of that method, preference is given to the DIN method and it is suggested to make this method available as a European Norm (EN). In addition, the feasibility of applying some other techniques, such as IR- or UV-spectrophotometry, high pressure liquid chromatography (HPLC) or nuclear magnetic resonance spectrometry (NMR) to the determination of aromatic content in petroleum products has been briefly investigated. Of these various techniques, only HPLC and NMR methods were found to be of practical interest. (Atomindex citation 10:422883)

FE/EES-79/10 PC **A03**/MF **A01**
Department of Energy, Morgantown, WV. Process Evaluation Office.
Economic Evaluation of the TRW Gravichem Process: One Unit Train Per Day of Coal.
K. D. Plants, and T. J. George. Jun 79, 38p

The TRW Gravichem process, is a chemical desulfurization process to remove sulfur from coal, has been evaluated by the Process Evaluation Office of the Department of Energy. The study was based on a flowsheet as received from TRW, and it was assumed that the coal was from the Lower Kittanning seam. Costs were determined for a commercial plant to produce 9865 tons per day of clean coal meeting the May 1978 EPA standards on sulfur emissions for new steam power-plants. Results of this study indicate processing charges of $25.41, $26.97, and $35.37 per ton of product assuming 12-, 15-, and 20-percent discounted cash flows (DCF) and 100 percent equity financing. With 33:67 debt-equity financing, again assuming 12-, 15-, and 20-percent DCF rates, the processing charges are $23.05, $25.40, and $29.60 respectively. (ERA citation 05:014622)

FE/EES-79/11 PC **A03**/MF **A01**
Department of Energy, Morgantown, WV. Process Evaluation Office.
Economic Evaluation of the Modified TRW Gravichem Process: One Unit Train Per Day of Coal.
K. D. Plants, and T. J. George. Jun 79, 34p

The TRW Gravichem process, a chemical desulfurization process to remove sulfur from coal, has been modified and evaluated by the Process Evaluation Office of the Department of Energy. The study was based on a revised version of the flowsheet which was received from TRW, and it was assumed that the coal was from the Lower Kittanning seam. Costs were determined for a commercial plant to produce 9902 tons per day of clean coal meeting the May 1978 EPA standards on sulfur emissions for new steam powerplants. Results of the study indicate processing charges of $20.36, $23.03, and $27.83 per ton of product assuming 12-, 15-, and 20-percent discounted cash flows (DCF) and 100 percent equity financing. With 33:67 debt-equity financing, again assuming 12-, 15-, and 20-percent DCF rates, the processing charges are $18.58, $20.33, and $23.50 respectively. (ERA citation 05:014623)

FE-2006-T2 PC **A10**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Mining and Fuels Engineering.
Elucidation of Coal Structural Components by Short Residence-Time Extractive Liquefaction.
D. Kang, L. L. Anderson, and W. H. Wiser. Aug 79, 201p
Contract EX-76-C-01-2006
Thesis. Submitted by D. Kang.

Short contact time, thermal reactions of bituminous coals with tetralin in hydrogen atmosphere were studied to ascertain the mechanism of the coal liquefaction process, the labile functional structures in the coal and the products, the hydrogen transfer reactions between coal and tetralin, and the kinetics of coal conversion. A differential reaction technique was used to achieve a slow progressive conversion of the coal, and to observe the rapidly developing initial reactions. Infrared spectra of the extracts formed at short contact time (as short as 6 seconds per pass) revealed the distinctive characteristics of the labile structures during the initial process of the coal liquefaction, especially in the spectral regions of oxygen functional groups such as hydrogen bonded phenolic OH, carbonyl and ether. Yield and kinetic data indicated reaction paths of the coal conversion. A hybrid, kinetic model containing first and second order rate equations was developed and tested for the data. (ERA citation 05:014687)

FE-2727-7 PC **A04**/MF **A01**
Mississippi Univ., University. Dept. of Chemical Engineering.
Mass Transport Characteristics of Zeolite Cracking Catalysts. Quarterly Report, April 1-June 30, 1979.
H. W. Haynes, Jr. 1980, 58p
Contract EF-77-S-01-2727

Previous reports have pointed out the discrepancy between our n-butane/NaY diffusivity measurements and the linear chromatography theory. A series of experiments has been completed which clearly demonstrates the existence of nonlinearities in this system. A similar discrepancy is evident in the system n-hexane/NaY. In contrast, the results for diffusion of 2,2-dimethylbutane, cyclohexane and t-decalin in zeolite NaY at 280 exp 0 C are well described by the theory. Surprisingly, no diffusion effects are observed in these systems. The diffusion is too rapid to be detected. The cracking of decalin and other hydrocarbons over various acid forms of zeolite -Y has been studied. Arrhenius plots of the first order rate constant for decalin conversion exhibit well-defined breakpoints indicative of a transition from the kinetics regime to an intracrystalline diffusion regime. By setting the Thiele modulus equal to unity at the breakpoint it is possible to estimate the diffusivity. This appears to be the first time that values of intracrystalline diffusivity have been reported for a species in a reaction environment. A series of hydrocracking studies over a NiWHUSY zeolite has been completed. Some problems were experienced with temporary plugging during hydrogenated pyrene runs, and the carbon material balances were rather poor. Excellent material balances were obtained during the tetralin runs. The catalyst is quite active for conversion of the hydrogenated pyrenes despite the large molecular size. An analysis of the kinetics is underway. (ERA citation 05:012955)

ISM-248 PC **A02**/MF **A01**
Ames Lab., IA.
Evaluation of Oxydesulfurization Processes for Coal. I. The Effect of the Ames Process on Model Organosulfur Compounds.
L. W. Chang, W. F. Goure, T. G. Squires, and T. J. Barton. 1980, 6p CONF-800303-9
Contract W-7405-ENG-82
179. national meeting of the American Chemical Society, Houston, TX, USA, 23 Mar 1980.

Using the assumption that it is sufficient to study a representative spectrum of organic sulfur compounds (used as models for such compounds in coal), various organic sulfur compounds were subjected to the Ames oxydesulfurization process conditions. Only thiophenol and compounds containing a benzylic sulfide linkage were oxidized to an appreciable extent. Thiphenol was converted to phenyl disulfide, which was resistant to further oxidation. Benzylphenyl sulfide was oxidized and cleaved to give benzaldehyde, benzoic acid and benzensulfonic acid; benzyl methyl sulfide gave similar results. The other compounds were unreactive under the Ames process conditions either by themselves or in the presence of coal. (ERA citation 05:014625)

JPRS-75653 PC **E03**/MF **A01**
Joint Publications Research Service, Arlington, VA.

Near East/North Africa Report, No. 2113. 'Oil and Domination' by Abol Hasan Bani-Sadr.
8 May 80, 222p
Trans. of mono. Naft Va Solteh, n.p., p1-200, 29 Aug 77.

A partial listing of topic areas includes: Role of oil in the Iranian economy; Oil's place in the economic future of Iran and the world; The role of oil in the industrial economies; Different types of oil companies in the activities of the industrial economies; Capital formation and attraction; The effects of capital on the orientations of dominant and dominated economies; Deception in oil prices and the transfer movement of oil revenues.

LBL-10373 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Process Development Studies on the Bioconversion of Cellulose and Production of Ethanol.
C. R. Wilke, and H. W. Blanch. Dec 79, 41p
Contract W-7405-ENG-48

Preliminary studies show minimal conversion of wood by sulfur dioxide at pressures of 38 psi at room temperature. Evaluation studies of Rut-C-30 and Rut-L-5 Trichoderma viride strains were compared. Studies on the continuous production system by manipulating temperature, pH, Tween 80 level substrate concentration, and dilution rate were performed. The known major components of cellulases were characterized. Studies on the reduction of the cost of producing sugar from corn stover were performed. Development of medium for continuous ethanol fermentation is discussed. Experiments show that the growth limiting factors for continuous fermentation were in the yeast extract. Biotin, pantothenic acid, and pyridoxine appear to be growth limiting factors. Addition of other vitamins had no effect on cell yield but increased ethanol production. The flash ferm process is discussed. Utilization of hemicellulose sugars is described. (ERA citation 05:015061)

LBL-8460 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Marine Biomass System: Anaerobic Digestion and Production of Methane.
K. F. Haven, M. Henriquez, and R. L. Ritschard.
Apr 79, 84p
Contract W-7405-ENG-48

Two approaches to kelp conversion to methane are described. First, a large (10.56 mi exp 2) oceanic farm using an artificial substrate and an upwelling system to deliver nutrient-rich deep ocean water to the kelp bed is described. This system can yield as much as 50 tons of kelp (dry ash free - DAF) per acre-year. Kelp are harvested by a specially designed 30,000 DWT ship and delivered to an onshore processing plant as a ground kelp slurry. The second system involves the use of a natrual coastal kelp bed. Growth rates in this bed are stimulated by a nutrient rich sewer outfall. A conceptual model is presented for calculation of the growth rate of kelp in this natural bed which can reach 15 tons (DAF) per acre-year. The harvest activity and processing plant are similar to those for oceanic farm system. In the next section of this report, the overall concept of kelp production and conversion to methane is discussed. In Section III the general design of the ocean farm system is presented and discussed while Section IV contains a similar description for the natural bed system. Section V presents the capital requirements and operational labor, resources and material requirements. Section VI describes the environmental residuals created by the operation of either system and, to the extent possible, quantifies the rate at which these residuals are generated. In addition to the technical data reported herein, cost data have been generated for the various processes and components utilized in each solar technology. The requirements for costing information basically arise from the need to compute parameters such as investment demands, employment patterns, material demands and residual levels associated with each technology for each of several national and regional scenarios. (ERA citation 05:013299)

NP-24086 PC **A07**/MF **A01**
National Board for Science and Technology, Dublin (Ireland).
Current Awareness Bulletin, Number 2, 1979.
Jul 79, 149p
U.S. Sales Only.

The production of fuels from animal wastes, crop residues, and urban wastes is included in this bibliography. Premium biomass usage of animal wastes and crop residues in the production of animal feeds and fertilizers also is included. Short-term rotation forestry, forest residue utilization, and cellulose utilization for fuel generation also are included. (ERA citation 05:015183)

NP-24326 PC **A05**/MF **A01**
National Board for Science and Technology, Dublin (Ireland).
Current Awareness Bulletin, November-December 1978.
Apr 79, 97p
U.S. Sales Only.

The production of fuels from animal wastes, crop residues, and urban wastes is included. Premium biomass usage of animal wastes and crop residues are also included. Short rotation forestry, forest residue utilization, and cellulose utilization for fuel generation are also included in this bibliography. (ERA citation 05:015184)

N80-21837/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Flame Tube Parametric Studies for Control of Fuel Bound Nitrogen Using Rich-Lean Two-Stage Combustion.
D. F. Schultz, and G. Wolfbrandt. 1980, 25p
NASA-TM-81472, DOE/NASA/2593-80/15
Contract EF-77-A-01-2593
Presented at Western States Sect. Of the Combust. Inst. Of Spring Meeting, Irvine, Calif., 21-22 Apr. 1980.

An experimental parametric study of rich-lean two-stage combustion in a flame tube is described and approaches for minimizing the conversion of fuel-bound nitrogen to nitrogen oxides in a premixed, homogeneous combustion system are evaluated. Air at 672 K and 0.48 MPa was premixed with fuel blends of propane, toluene, and pyridine at primary equivalence ratios ranging from 0.5 to 2.0 and secondary equivalence ratios of 0.5 to 0.7. Distillates of SRC-II, a coal syncrude, were also tested. The blended fuels were proportioned to vary fuel hydrogen composition from 9.0 to 18.3 weight percent and fuel nitrogen composition from zero to 1.5 weight percent. Rich-lean combustion proved effective in reducing fuel nitrogen to NO sub x conversion; conversion rates up to 10 times lower than those normally produced by single-stage combustion were achieved. The optimum primary equivalence ratio, where the least NO sub x was produced and combustion efficiency was acceptable, shifted between 1.4 and 1.7 with changes in fuel nitrogen content and fuel hydrogen content. Increasing levels of fuel nitrogen content lowered the conversion rate, but not enough to avoid higher NO sub x emissions as fuel nitrogen increased.

ORNL/Sub-7240/6 PC **A05**/MF **A01**
Scientific Design Co., Inc., New York.
Evaluation of the Texaco Synthesis Gas Generation Process for the Production of Hydrogen from SRC-II Residue.
T. Y. Chang, and A. S. West. Dec 79, 87p
Contract W-7405-ENG-26

The results are presented of an evaluation of the Texaco Synthesis Gas Generation Process for the production of hydrogen from SRC-II vacuum bottoms residue. Based on gasification tests carried out by Texaco, the operability and efficiency of the Gasifier have been commented upon. Preliminary process designs for a Texaco gasification facility for a commercial scale coal liquefaction plant were prepared. A number of studies were performed to establish a near-optimal operating pressure and method of acid gas removal. Plant investment and operating cost estimates are included. The report concludes that the Texaco Gasifier is well suited for the efficient production of hydrogen from SRC-II residue and only minimal developmental work is needed prior to commercialization. Because of the short duration of the test runs, refractory and burner lives are a point of concern. Based on the current state of oxygen compression technology the gasifier should be designed to operate at about 800 psig. (ERA citation 05:015039)

PAT-APPL-6-047 447 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Cyclic Thermochemical Process for Producing Hydrogen Using Cerium-Titanium Compounds.
Patent Application,
C. E. Bamberger. Filed 11 Jun 79, 13p
Contract W-7405-ENG-26
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A thermochemical cyclic process for producing hydrogen employs the reaction between ceric oxide and titanium dioxide to form cerium titanate and oxygen. The titanate is treated with an alkali metal hydroxide to give hydrogen, ceric oxide, an alkali metal titanate and water. Alkali metal titanate and water are boiled to give titanium dioxide which, along with ceric oxide, is recycled. (ERA citation 05:020228)

PATENT-4 169 884
Not available NTIS
Department of Energy, Washington, DC.
Hydrogen Production from Water Using Copper and Barium Hydroxide.
Patent,
C. E. Bamberger, and D. M. Richardson. Filed 17 Aug 78, patented 2 Oct 79, 6p PAT-APPL-934 664
Supersedes PAT-APPL-934 664-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A process for producing hydrogen comprises the step of reacting metallic Cu with Ba(OH) sub 2 in the presence of steam of produce hydrogen and BaCu sub 2 O sub 2 . The BaCu sub 2 O sub 2 is reacted with H sub 2 O to form Cu sub 2 O and a Ba(OH) sub 2 product for recycle to the initial reaction step. Cu can be obtained from the Cu sub 2 O product by several methods. In one embodiment the Cu sub 2 O is reacted with HF solution to provide CuF sub 2 and Cu. The CuF sub 2 is reacted with H sub 2 O to provide CuO and HF. CuO is decomposed to Cu sub 2 O and O sub 2 . The HF, Cu and Cu sub 2 O are recycled. In another embodiment the Cu sub 2 O is reacted with aqueous H sub 2 SO sub 4 solution to provide CuSO sub 4 solution and Cu. The CuSO sub 4 is decomposed to CuO and SO sub 3 . The CuO is decomposed to form Cu sub 2 O and O sub 2 . The SO sub 3 is dissolved to form H sub 2 SO sub 4 . H sub 2 SO sub 4 , Cu and Cu sub 2 O are recycled. In another embodiment Cu sub 2 O is decomposed electrolytically to Cu and O sub 2 . In another aspect of the invention, Cu is recovered from CuO by the steps of decomposing CuO to Cu sub 2 O and O sub 2 , reacting the Cu sub 2 O with aqueous HF solution to produce Cu and CuF sub 2 , reacting the CuF sub 2 with H sub 2 O to form CuO and HF, and recycling the CuO and HF to previous reaction steps. 7 claims. (ERA citation 05:020236)

PATENT-4 180 555
Not available NTIS
Department of Energy, Washington, DC.
Process for Producing Hydrogen from Water Using Cobalt and Barium Compounds.
Patent,
C. E. Bamberger, and D. M. Richardson. Filed 17 Aug 78, patented 25 Dec 79, 6p PAT-APPL-934 768
Supersedes PAT-APPL-934 768-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A thermochemical process for producing hydrogen comprises the step of reacting CoO with BaO or Ba(OH) sub 2 in the presence of steam of produce H sub 2 and novel double oxides of Ba and Co having the empirical formulas BeCoO sub 2 sub 33 and Ba sub 2 CoO sub 3 sub 33 . The double oxide can be reacted with H sub 2 O to form Co sub 3 O sub 4 and Ba(OH) sub 2 which can be recycled to the original reaction. The Co sub 3 O sub 4 is converted to CoO by either of two procedures. In one embodiment Co sub 3 O sub 4 is heated, prefer-

ably in steam, to form CoO. In another embodiment Co sub 3 O sub 4 is reacted with aqueous HCl solution to produce CoCl sub 2 and Cl sub 2 . The CoCl sub 2 is reacted with H sub 2 O to form CoO and HCl and the CoO is recycled to the initial reaction step. The Cl sub 2 can be reacted with H sub 2 O to produce HCl. HCl can be recycled for reaction with Co sub 3 O sub 4 . 8 claims. (ERA citation 05:020235)

PB80-115264 PC **E11**/MF **E11**
New Mexico Univ., Albuquerque. Technology Application Center.
Hydrogen Energy: A Bibliography with Abstracts. Quarterly Update January-March 1979.
Mar 79, 51p TAC-H79-001
Contract NASw-2936
See also Quarterly Update Apr-Jun 79, PB80-174014.

The Hydrogen Energy Quarterly Update is a bibliographic series that contains citations and abstracts from over 7000 different sources devoted to hydrogen as a synthetic fuel or energy carrier. Foreign and domestic publications are cited, abstracted and indexed. The series provides current awareness to those interested in hydrogen energy. For easy reference, the Hydrogen Energy Quarterly is divided into five sections: general; production; utilization; combustion, transmission, distribution and storage; and, safety.

PB80-169162 PC **A03**/MF **A01**
Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Research Group.
Preparation and Stability of Emulsions of Methanol in Automotive Diesel Oil,
C. G. McCormack. Oct 79, 35p ISBN-0-7988-1730-5, CSIR-CENG-294

Short term emulsification of up to 20% methanol in diesel oil (stability lasting a few hours) is feasible but the emulsifiers successful in this respect are costly and have to be applied in relatively high concentrations. No emulsifier was found which produces an emulsion with long-term stability; mutual solubilities of the various components and solubility changes with temperature were identified as the most important causes. It is unlikely that an emulsifier will be found which produces stable temperature-insensitive emulsions of methanol in diesel oil. Even if such an emulsifier exists the required amount and costs are expected to be prohibitive in a fuel application.

PB80-169998 PC **A07**/MF **A01**
Panama Univ., Panama City. Inst. Politecnico.
Approvechamiento de Desechos para la Generacion de Bio-Gas como Fuente de Energia (Utilization of Residues for the Obtention of Bio-Gas as an Energy Source),
Jose del C. Gonzalez B, and Luis Augusto Munoz V. 1978, 143p
Text in Spanish. Sponsored in part by Agency for International Development, Washington, DC.

This report explains the production of methane gas by the process of anaerobic fermentation, from organic sources such as poultry or cow manure. Analyzes the inconveniences at the present of using human excreta. Other sources are: food waste, mud, vegetable residues, all useful for conversion to obtain methane gas. It gives ample details on the chemical composition of the various bio-gas, depending on its origin, and the uses and industrial future of the gas. Mechanical devices such as batteries and machinery are explained, with illustrations. A list of safety tips is included.

PB80-170327 PC **A06**/MF **A01**
Resources for the Future, Inc., Washington, DC.
The Future Regional Distribution of National Synthetic Fuel Capacity.
Final rept.,
John J. Schanz, Jr., James W. Sawyer, Jr., and Harry Perry. Jun 79, 122p NSF/PRA-7601861
Grant NSF-OEP76-01861

The purpose of this study is to examine the factors which have and will continue to influence plans for the eventual locations of future facilities to produce synthetic liquid and gaseous hydrocarbons from either coal or oil shale. The objective is to refine the analyses of where these plants are most likely to be placed regionally. The first section of this report examines previous case studies followed by an analysis of technological constraints on power plant location. The locational decision-making process is looked at from the basis of four anticipated types of energy-producing facilities – oil producing companies, interstate pipeline transmission companies, regional gas distributors, and energy consulting companies. The final section addresses two potential issues of the findings--forecasting and modelling of regional energy development, and policy-based decision-making.

PB80-171226 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Gasohol Test Program.
Technical rept.,
Richard Lawrence. Feb 80, 37p EPA-AA-TAEB-79-4B
See also report dated Dec 78, PB-290 569.

A request for a waiver to permit use of ten percent Ethanol in gasoline ('gasohol') was considered by EPA-Mobile Source Enforcement Division (MSED). The Emission Control Technology Division (ECTD) in Ann Arbor, Michigan was requested to assist MSED by testing ten vehicles on two gasoline fuels and three gasohol fuels. In addition, ECTD directed Southwest Research Institute (a contractor laboratory) to test three vehicles on the five fuels plus other fuels containing methyl tertiary butyl ether (MTBE) and teritary butyl alcohol (TBA), other fuel additives for which waivers have been requested. EPA-ORD was requested to provide more extensive emission data on two test vehicles. Since the completion of the ECTD test program described in this report, EPA has acted to allow the use of ten percent ethanol in gasoline. Future control of this or other fuel additives is authorized under Section 211 of the 1977 Amendments to the Clean Air Act.

PB80-174014 PC **E11**/MF **E11**
New Mexico Univ., Albuquerque. Technology Application Center.
Hydrogen Energy: A Bibliography with Abstracts. Quarterly Update April-June 1979.
Jun 79, 96p TAC-H79-002
Contract NASw-2936
See also Quarterly Update Jan-Mar 79, PB80-115264.

The Hydrogen Energy Quarterly Update is a bibliographic series that contains citations and abstracts from over 7000 different sources devoted to hydrogen as a synthetic fuel or energy carrier. Foreign and domestic publications are cited, abstracted and indexed. The series provides current awareness to those interested in hydrogen energy. For easy reference, the Hydrogen Energy Quarterly is divided into five sections: general; production; utilization; combustion, transmission, distribution and storage; and, safety.

PB80-177397 MF **A01**
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
A Prototype Mobile System for Pyrolysis of Agricultural And/Or Silvicultural Wastes.
Final rept.,
J. W. Tatom, A. R. Colcord, W. M. Williams, K. R. Purdy, and J. J. Demeter. Oct 79, 141p EPA-600/7-79-230
Grant EPA-R-803430
Available microfiche only because of poor quality.

This research program was initiated to investigate three elements of a prototype mobile system for pyrolysis of agricultural and/or silvicultural wastes into clean, transportable fuels: the pyrolytic converter itself, a pyrolysis-gas-fueled internal combustion engine, and the combustion and emission characteristics of pyrolytic char and oil. An experimental study of the performance of the Georgia Tech Engineering Experiment Station one-ton-per-hour pyrolytic converter was conducted. Peanut hulls and pine sawdust were used as representative agricultural and silvicultural waste materials. Effects of converter capacity, feed material, mechanical agitation, bed depth, and air-to-feed ratio on product yields were determined. An experimental study of the combustion and emission characteristics of powdered char was performed by the Pittsburgh Energy Research Center. Stable combustion and satisfactory combustion efficiency were obtained with powdered high-volatile char alone and with 50-50 blends of high-volatile or low-volatile pulverized char and coal. Excellent flame stability and carbon-combustion efficiency were obtained when powdered char was mixed with pyrolysis oil and No. 6 fuel oil and fired as a slurry in an oil-fired boiler. Studies of the combustor and boiler flue gases showed significant reductions in SO2 emissions.

PB80-810476 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hydrogen Production. 1978-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-May 80,
Diane M. Cavagnaro. May 80, 207p
Updates NTIS/PS-75/379. Supersedes NTIS/PS-79/0541. See also 1964-1977, NTIS/PS-79/0540.

The cited reports include studies on the manufacturing of hydrogen by electrolysis, coal gasification, and other techniques. They cover both experimental research and production on the industrial scale. Although most of the reports are on production methods, economic studies are also included. (This updated bibliography contains 200 abstracts, 56 of which are new entries to the previous edition.)

SAN-0034-239-T1 PC **A11**/MF **A01**
California Univ., Berkeley. Sanitary Engineering Research Lab.
Solar Energy Conversion Through Biophotolysis. Third Annual Report, April 1, 1978-March 31, 1979.
J. R. Benemann, M. A. Murry, P. C. Hallenbeck, K. Miyamoto, and A. G. Olafsen. 1 May 79, 236p
Contract EY-76-S-03-0034-239

This report covers the progress during the third year of this project. The state-of-the-art of biophotolysis was reviewed and a bioengineering analysis carried out. The conclusions were that practical biophotolysis systems are feasible; however, they will require, in most cases, relatively long-term R and D. The biophotolysis system developed under this project, utilizing heterocystous blue-green algae, was demonstrated both indoors and outdoors with a model converter system using the heterocystous blue-green alga Anabaena cylindrica. Maximal light energy conversion efficiencies were 2.5% indoors and about 0.2% outdoors, averaged for periods of about two weeks. Achievement of such rates required optimization of N sub 2 supply and culture density. A small amount of N sub 2 in the argon gas phase used to sparge the cultures was beneficial to the stability of a long-term hydrogen-production activity. A relatively small amount of the hydrogen produced by these cultures can be ascribed to the activity of the reversible hydrogenase which was studied by nitrogenase inactivation through poisoning with tungstate. The regulation of nitrogenase activity in these algae was studied through physiological and immunochemical methods. In particular, the oxygen protection mechanism was examined. Thermophilic blue-green algae have potential for biophotolysis; hydrogen production was studied in the laboratory. Preliminary experiments on the photofermentation of organic substrates to hydrogen was studied with photosynthetic bacteria. (ERA citation 05:015037)

SAN-1241-3 PC **A19**/MF **A01**
Garrett Energy Research and Engineering Co., Inc., Claremont, CA.
Conversion of Biomass Materials into Gaseous Products. Final Report - Operation of the PDU.
D. E. Garrett, and R. D. Mikesell. Sep 79, 431p
Contract EY-76-C-03-1241

Studies were completed on the Garrett Energy Research and Engineering Company's multiple hearth furnace for the thermal conversion of biomass into a medium Btu gaseous product. Initial work on a two foot diameter, single hearth reactor provided comprehensive design data through an examination of the pertinent variables over a fairly wide range of operations. Kinetic and dynamic models were obtained for each of the reaction stages that would occur within a multiple hearth reactor. This data led to the design and construction of a process development unit (PDU) which consisted of four, four foot diameter hearths capable

of processing six wet tons (50% moisture), or three dry tons of biomass per day through the steps of preheating, drying, pyrolysis, combustion, and gasification. Operation of the PDU included 10 to 20 runs on each of these steps, and work was completed with a five day, 24 hour per day, continuous operation. Process design, capital and operating costs, and an economic analysis based on this data indicated that no cost, 50% moisture manure could produce about a 300 Btu gas with a breakeven price of $4 per million Btu's in a 100 dry ton per day unit and $2.40 per million Btu's in a 300 tons per day unit. These favorable results lead to a recommendation that further work should be done, optimizing the performance of the PDU and testing other potential biomass feed materials for their specific design characteristics. (ERA citation 05:015050)

SAN-1839-T1 PC **A03**/MF **A01**
Teledyne CAE, Toledo, OH.
Gas Turbine Demonstration of Pyrolysis-Derived Fuels. First Technical Progress Report, September 1, 1978-March 31, 1979.
G. Jasas. 1979, 34p
Contract ET-78-C-03-1839

The objective of this program is to demonstrate the feasibility of utilizing pyrolytic oil and char as a fuel for a combustion turbine engine. This is the first phase of an extended program with the ultimate goal of commercializing a gas turbine engine and electrical generating system which is independent of petroleum-based fuels. Maximum use of existing technology and current production engine hardware (Teledyne CAE Model J69-T-29 Turbojet Engine) is being incorporated for a sequence of test evaluations ranging from isolated combustor component tests to full scale engine demonstration tests. The technical goals to be achieved during the course of this project are: pyrolytic fuel characterization in terms of its properties and constituents; pyrolytic fuel combustion technology in a gas turbine application in terms of pyrolytic oil atomization, quantity of char burned, emissions, performance and associated combustion system aerothermodynamics; pyrolytic fuel (oil and char slurry) handling, mixing, and storage technology; and engine materials compatibility with the pyrolytic fuel and its combustion products. The program has been planned, hardware is being procured, and design of the combustor and pyrolytic fuel combustion analysis studies are underway. (ERA citation 05:016336)

SAND-80-0189 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Napoleonville Cavern Usability in the SPR: a Preliminary Geotechnical Assessment.
J. R. Tillerson, and M. H. Gubbels. Jan 80, 49p
Contract EY-76-C-04-0789

One conclusion drawn from this preliminary analysis is that the web between the Georgia-Pacific cavern and Clifton cavern number 1 at Napoleonville should be stable if the pressure integrity of each cavern is maintained and the pillar width is not less than 100', but some spallation may occur if the pressure head cannot be maintained. The second conclusion drawn is that the creep closure of cavern number 6 at Napoleonville is not significantly different from that anticipated in cavern number 6 at West Hackberry. The primary recommendation which results from this evaluation is that prior to site acceptance a thorough program of field and laboratory investigations should be designed and conducted to assure cavern integrity and usability. In addition, the test procedures and results from the recertification tests on West Hackberry cavern number 6 should be carefully reviewed to aid in the evaluation of the Napoleonville caverns. (ERA citation 05:014820)

SRI-P-7877 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Production Cost Analysis of Euphorbia Lathyris. Final Report.
D. A. Mendel, F. A. Schooley, and R. L. Dickenson. Aug 79, 32p
Contract AP01-79ET23126

The purpose of SRI's study was to estimate the costs of producing Euphorbia in commercial quantities in five regions of the United States, which include both irrigated and nonirrigated areas. The study assumed that a uniform crop yield could be achieved in the five regions by varying the quantities of production inputs. Therefore, the production costs estimates, which are based on fourth quarter 1978 dollars, include both fixed and variable costs for each region. Doane's Machinery Custom Rates for 1978 were used to estimate all variable costs except materials, which were estimated separately. Custom rates are determined by members of the Doane Countywide Farm Panel, a group of farmers specifically selected to represent the various sizes and types of commercial farms found throughout the country. The rates reported are the most recent rates the panel members had either paid, charged, or known for certain a second party had paid or charged. Custom rates for any particular operation include equipment operating costs (fuel, lubrication, and repairs), equipment ownership costs (depreciation, taxes, interest), as well as a labor charge for the operator. Custom rates are regionally specific and thereby assist the accuracy of this analysis. Fixed costs include land, management, and transportation of the plant material to a conversion facility. When appropriate, fixed costs were regionally specific. Changes in total production costs over future time periods were not addressed. The total estimated production costs of Euphorbia in each region were compared with production costs for corn and alfalfa in the same regions. Finally, the effects on yield and costs of changes in the production inputs were estimated. (ERA citation 05:015187)

21E. Jet and Gas Turbine Engines

AD-A083 172/7 PC **A04**/MF **A01**
Boeing Aerospace Co Seattle WA Boeing Military Airplane Development
PIPSI/Navy - Rapid Evaluation of Propulsion System Effects for the Navy Gas Turbine Engine Code, NEPCOMP.
Final rept. 28 Jun-11 Oct 79,
W. H. Ball. 11 Oct 79, 55p NADC-79081-60
Contract N62269-79-C-0278

This report describes the work accomplished during a fourteen-week contract to modify two existing interactive computer programs for calculating installed engine performance, including inlet and nozzle corrections and to demonstrate their use for the NADC. (Author)

AD-A083 246/9 PC **A04**/MF **A01**
Air Force Aero Propulsion Lab Wright-Patterson AFB OH
Theoretical Performance Limits for Non-Static Ejector Thrust Augmentors.
Final rept. Feb-Sep 79,
James S. Petty. Jan 80, 55p Rept no. AFAPL-TR-79-2120

An analytical study was performed to determine the theoretical limits on the performance of non-static ejector thrust augmentors. Idealizing assumptions were made, such as inviscid compressible working fluids, isentropic flows in inlets, diffusers, nozzles and ducts, constant pressure mixing, and thermally and calorically perfect fluids. By ignoring details of the primary flow 'pump', the performance of ejector augmentors was found in terms of three parameters (the secondary/primary mass flow ratio, a pressure parameter and a temperature parameter) in a form which was not an explicit function of the flight Mach number. It was also shown that multi-stage ejectors offered no performance improvement over ideal single-stage ejectors. Two primary 'pump' devices, a turbine engine gas generator and an isentropic compressor, were considered. With them, the Mach number dependent behavior of ideal ejectors was determined. As a result of this study, the following conclusions were drawn: (1) The performance of ideal ejector is severely degraded by increasing the primary fluid temperature, (2) the performance of ideal ejectors is degraded faster than that of ideal turbofans as the flight Mach number is increased, (3) Neither the turbine engine nor the isentropic compressor is a suitable 'pump' for ideal ejectors, except at very low Mach numbers, and (4) Ejector augmentors should be most useful for low flight speed applications; e.g., V/STOL. (Author)

FE-1806-68 PC **A04**/MF **A01**
General Electric Co., Schenectady, NY. Gas Turbine Div.
Development of High Temperature Turbine Subsystem Technology to a Technology Readiness Status, Phase II. Progress Report, May 1979.
M. W. Horner. 10 Jun 79, 54p
Contract EX-76-C-01-1806

Progress in the design, fabrication and testing of components for high temperature gas turbines for combined-cycle power plants is reported. Hot gas path development test stand fabrication is continuing. The fabrication status of the two first stage nozzles to be tested in the Turbine Simulator is reported. Shock tunnel test section calibration data is presented which verifies the new location of the tine of arrival sensors. All construction work on the PGCUS is completed. Aerodynamic component testing of endwall configurations has started. Testing of the new radial channel heat transfer specimens in the motorized test rig is continuing. A correction factor to be used with the air turbine heat transfer test results, to account for the inoperative leading edge heaters when the test was conducted, is presented. An analysis of the compressor discharge casing strut spring rates was completed. Features to expedite the fabrication of the sectoral combustor to be tested in the HGPDTS are discussed. Additional details regarding the combustor design analysis are presented. All planned wind tunnel testing in support of the combustor development have been completed. Data from the most recently completed heat transfer coefficient test are being reduced. A re-evaluation of the thermal strain in the trailing edge of the first stage nozzle, with the effects of the initial hot isostatically pressed (HIP) cycle superimposed, has been completed. The design remains compatible with the LCF design criteria. An alternative concept for convective shroud cooling is described. Complete status of the materials and processes, and mechanics of materials tasks are discussed. (ERA citation 05:015682)

N80-21323/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Experimental Evaluation of a Spinning-Mode Acoustic-Treatment Design Concept for Aircraft Inlets.
L. J. Heidelberg, E. J. Rice, and L. Homyak. Apr 80, 29p NASA-TP-1613, E-185

An aircraft-inlet noise suppressor method based on mode cutoff ratio was qualitatively checked by testing a series of liners on a YF-102 turbofan engine. Far-field directivity of the blade passing frequency was used extensively to evaluate the results. The trends and observations of the test data lend much qualitative support to the design method. The best of the BPF liners attained a suppression at design frequency of 19 dB per unit length-diameter ratio. The best multiple-pure-tone linear attained a remarkable suppression of 65.6 bB per unit length-diameter ratio.

N80-21324/2 PC **A04**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Aerodynamic Performances of Three Fan Stator Designs Operating with Rotor Having Tip Speed of 337 Meters Per Second and Pressure Ratio of 1.54. Relation of Analytical Code Calculations to Experimental Performance.
T. F. Gelder, J. F. Schmidt, and G. M. Esgar. Apr 80, 53p NASA-TP-1614, E-137

A hub-to-shroud and a blade-to-blade internal-flow analysis code, both inviscid and basically subsonic, were used to calculate the flow parameters within four stator-blade rows. The produced ratios of maximum suction-surface velocity to trailing-edge velocity correlated well in the midspan region, with the measured total-parameters over the minimum-loss to near stall operating range for all stators and speeds studied. The potential benefits of a blade designed with the aid of these flow analysis codes are illustrated by a proposed redesign of one of the four stators studied. An overall efficiency improvement of 1.6 points above the peak measured for that stator is predicted for the redesign.

N80-21325/9 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

Performance of Single-Stage Axial-Flow Transonic Compressor with Rotor and Stator Aspect Ratios of 1.19 and 1.26 Respectively, and with Design Pressure Ratio of 2.05.
R. D. Moore, and L. Reid. Apr 80, 103p NASA-TP-1659, E-138

The overall and blade-element performances of a low-aspect-ratio transonic compressor stage are presented over the stable operating flow range for speeds from 50 to 100 percent of design. At design speed the rotor and stage achieved peak efficiencies of 0.876 and 0.840 at pressure ratios of 2.056 and 2.000, respectively. The stage stall margin at design speed was 10 percent.

N80-21326/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Analysis of Uncertainties in Turbine Metal Temperature Predictions.
F. S. Stepka. Apr 80, 19p NASA-TP-1593, E-228

An analysis was conducted to examine the extent to which various factors influence the accuracy of analytically predicting turbine blade metal temperatures and to determine the uncertainties in these predictions for several accuracies of the influence factors. The advanced turbofan engine gas conditions of 1700 K and 40 atmospheres were considered along with those of a highly instrumented high temperature turbine test rig and a low temperature turbine rig that simulated the engine conditions. The analysis showed that the uncertainty in analytically predicting local blade temperature was as much as 98 K, or 7.6 percent of the metal absolute temperature, with current knowledge of the influence factors. The expected reductions in uncertainties in the influence factors with additional knowledge and tests should reduce the uncertainty in predicting blade metal temperature to 28 K, or 2.1 percent of the metal absolute temperature.

N80-21329/1 PC **A02**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT. Commercial Products Div.
Manufacture of Low Carbon Astrology Turbine Disk Shapes by Hot Isostatic Pressing. Volume 2, Project 1.
Final Report.
R. D. Eng, and D. J. Evans. Jan 79, 10p NASA-CR-135410, PWA-5574-37
Contract NAS3-20072

The performance of a hot isotatic pressed disk installed in an experimental engine and exposed to realistic operating conditions in a 150-hour engine test and a 1000 cycle endurance test is documented. Post test analysis, based on visual, fluorescent penetrant and dimensional inspection, revealed no defects in the disk and indicated that the disk performed satisfactorily.

N80-21330/9 PC **A03**/MF **A01**
IIT Research Inst., Chicago, IL.
Thermal Fatigue and Oxidation Data for Directionally Solidified Mar-M 246 Turbine Blades.
V. L. Hill, and V. E. Humphreys. Jan 80, 45p NASA-CR-159798, IITRI-M6003-53
Contract NAS3-19696

Thermal fatigue and oxidation data were obtained for 11 plasma spray coated and 13 uncoated directionally solidified and single crystal MAR-M 246 blades. Blade coatings on the airfoil included several metal-oxide thermal barrier layers based on Al2O3, Cr2O3, or ZrO2. The 24 turbine blades were tested simultaneously for 3000 cycles in fluidized beds maintained at 950 and 25 C using a symmetrical 360 set thermal cycle. In 3000 cycles, only uncoated turbine blades exhibited cracking on the trailing edge near the platform; 3 of the 13 uncoated blades did not crack. Cracking occurred over the range 400 to 2750 cycles, with single crystal blades indicating the poorest thermal fatigue resistance. Oxidation of the uncoated blades was limited in 3000 cycles. All coatings indicated microscopically visible spalling at the trailing edge radius after 3000 cycles. Severe general spalling on the airfoil was observed for two multilayered coatings.

N80-21331/7 PC **A09**/MF **A01**
AiResearch Mfg. Co., Phoenix, AZ.
Airesearch QCGAT Program.
Final Report.
R. W. Heldenbrand, and W. M. Norgren. 10 Jan 79, 199p NASA-CR-159758, AIRESEARCH-21-3071
Contract NAS3-20585

A model TFE731-1 engine was used as a baseline for the NASA quiet clean general aviation turbofan engine and engine/nacelle program designed to demostrate the applicability of large turbofan engine technology to small general aviation turbofan engines, and to obtain significant reductions in noise and pollutant emissions while reducing or maintaining fuel consumption levels. All new technology design for rotating parts and all items in the engine and nacelle that contributed to the acoustic and pollution characteristics of the engine system were of flight design, weight, and construction. The major noise, emissions, and performance goals were met. Noise levels estimated for the three FAR Part 36 conditions, are 10 t0 15 ENPdB below FAA requirements; emission values are considerably reduced below that of current technology engines; and the engine performance represents a TSFC improvement of approximately 9 percent over other turbofan engines.

N80-21332/5 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT.
Development of Improved High Pressure Turbine Outer Gas Path Seal Components.
Progress Report, Dec. 1976 - Oct. 1979.
L. T. Shiembob. Jan 80, 80p NASA-CR-159801, PWA-5568
Contract NAS3-20590

A plasma sprayed graded layered ceramic/metallic (ZrO2/CoCrAlY) seal was evaluated for JT9D turbine application by rig and engine tests. Four cyclic thermal shock rig tests were conducted during the program. Three completed 1000 simulated engine thermal cycle tests and the fourth completed 500 cycles without severe cracking or spalling. Three ceramic seals were installed in a JT9D experimental engine to evaluate the effect of the engine thermal environment on the seals. All three seals completed the test successfully without severe cracking or spalling. The three seals did have slight laminar cracks at the 85/15-40/60 ZrO2/CoCrAlY interface. The second engine test evaluated the rub capabilities of the seal. Six ceramic seals were installed in the engine with fourteen abrasive tip blades. Three of the six seals rubbed to a depth of 24 mils. Eight of the fourteen abrasive tip blades showed evidence of wear. Three of the eight blades wore a maximum of five mils. Engine rub test results demonstrated the potential of reducing turbine clearances and thereby improving engine performance by use of sprayed ceramic seals.

N80-21333/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Steady-State Performance of J85-21 Compressor at 100 Percent of Design Speed with and Without Interstage Rake Blockage.
R. A. Werner. Mar 80, 36p NASA-TM-81451, E-377

Internal compressor instrumentation blockage effects on steady state J85-21 compressor performance at 100 percent of design speed are determined. The blockage was generated by instrumented vanes for the first three compressor stages and by removal rakes for stages 4 to 9. Individual flow passage blockages ranged up to 4.5 percent with the instrumented vanes and up to 22 percent with the removable interstage rakes. At a Reynolds number index of 1.0, pressure ratio and airflow remained unchanged with insertion of the interstage rakes, but efficiency dropped 0.3 percentage point. Compressor exit profiles, compressor stage static pressure rise coefficients, turbine exit temperature, and fuel flow are also presented.

N80-21334/1 PC **A02**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL.
Data Analysis of p sub T/p sub S Noseboom Probe Testing on F100 Engine P680072 at NASA Lewis Research Center.
Final Report.
C. H. Foote. Mar 80, 23p NASA-CR-159616, PWA-FR-12540
Contract NAS3-19442

Results from the altitude testing of a P sub T/P sub S noseboom probe on the F100 engine are discused. The resultss are consistent with sea level test results. The F100 engine altitude test verified automatic downmatch with the engine pressure ratio control, and backup control inlet case static pressure demonstrated sufficient accuracy for backup control fuel flow scheduling. The production P6 probe measured Station 6 pressures accurately for both undistorted and distorted inlet airflows.

N80-21706/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Similarity Tests of Turbine Vanes, Effects of Ceramic Thermal Barrier Coatings.
H. J. Gladden. 1980, 14p NASA-TM-81473, E-407
Proposed for Presentation at 1980 Natl. Heat Transfer Conf., Orlando, Fla., 27-30 Jul. 1980; Sponsored by Heat Transfer and Gas Turbine Div. Of Asme.

The role of material thermal conductivity was analyzed for its effect on the thermal performance of air-cooled gas turbine components coated with a ceramic thermal barrier material when tested at reduced temperatures and pressures. It is shown that the thermal performance can be evaluated reliably at reduced gas and coolant conditions; however, thermal conductivity corrections are required for the data at reduced conditions. Corrections for a ceramic thermal barrier coated vane are significantly different than for an uncoated vane. Comparison of uncorrected test data, therefore, would show erroneously that the thermal barrier coating was ineffective. When thermal conductivity corrections are applied to the test data these data are then shown to be representative of engine data and also show that the thermal barrier coating increases the vane cooling effectiveness by 12.5 percent.

N80-22045/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Spectral Structure of Pressure Measurements Made in a Combustion Duct.
J. H. Miles, and D. D. Raftopoulos. 1980, 46p NASA-TM-81471, E-404
Presented at 99TH Meeting of the Acoust. Soc. Of AM., Atlanta, 21-25 Apr. 1980.

A model for acoustic plane wave propagation in a combustion duct through a confined, flowing gas containing soot particles is presented. The model takes into account only heat transfer between the gas and soot particles. As a result, the model depends on only a single parameter which can be written as the ratio of the soot particle thermal relaxation time to the soot particle mass fraction. The model yields expressions for the attenuation and dispersion of the plane wave which depends only on this single parameter. The model was used to calculate pressure spectra in a combustion duct. The results were compared with measured spectra. For particular values of the single free parameter, the calculated spectra resemble the measured spectra. Consequently, the model, to this extent, explains the experimental measurements and provides some insight into the number and type of particles.

N80-22046/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Noise Suppression Due to Annulus Shaping of an Inverted-Velocity-Profile Coaxial Nozzle.
J. Goodykoontz, and U. Vonglahn. Apr 80, 27p NASA-TM-81460, E-389
Presented at 99TH Meeting of the Acoust. Soc. Of AM., Atlanta, 21-25 Apr. 1980.

An inverted velocity profile coaxial nozzle for use with supersonic cruise aircraft produces less jet noise than an equivalent conical nozzle. Furthermore, decreasing the annulus height (increasing radius ratio with constant flow) results in further noise reduction benefits. The annulus shape (height) was varied by an eccentric mounting of the

annular nozzle with respect to a conical core nozzle. Acoustic measurements were made in the flyover plane below the narrowest portion of the annulus and at 90 deg and 180 deg from this point. The model-scale spectra are scaled up to engine size (1.07 m diameter) and the perceived noise levels for the eccentric and baseline concentric inverted velocity profile coaxial nozzles are compared over a range of operating conditions. The implications of the acoustic benefits derived with the eccentric nozzle to practical applications are discussed.

N80-22047/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Noise Suppression Due to Annulus Shaping of Conventional Coaxial Nozzle.
U. Vonglahn, and J. Goodykoontz. 1980, 19p NASA-TM-81461, E-390
Prepared for the 99 Meeting of the Acoust. Soc. Of AM., Altanta, 21-25 Apr. 1980.

A method which shows that increasing the annulus width of a conventional coaxial nozzle with constant bypass velocity will lower the noise level is described. The method entails modifying a concentric coaxial nozzle to provide an eccentric outer stream annulus while maintaining approximately the same through flow as that for the original concentric bypass nozzle. Acoustical tests to determine the noise generating characteristics of the nozzle over a range of flow conditions are described. The tests involved sequentially analyzing the noise signals and digitally recording the 1/3 octave band sound pressure levels. The measurements were made in a plane passing through the minimum and maximum annulus width points, as well as at 90 degrees in this plane, by rotating the outer nozzle about its axis. Representative measured spectral data in the flyover plane for the concentric nozzle obtained at model scale are discussed. Representative spectra for several engine cycles are presented for both the eccentric and concentric nozzles at engine size.

N80-22048/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
An Improved Prediction Method for the Noise Generated in Flight by Circular Jets.
J. R. Stone, and F. J. Montegani. 1980, 33p NASA-TM-81470, E-403
Prepared for the 99TH Meeting of the Acoust. Soc. Of AM., Atlanta, 21-25 Apr. 1980.

A semi-empirical model for predicting the noise generated by jets exhausting from circular nozzles is presented and compared with small-scale static and simulated-flight data. The present method is an updated version of that part of the original NASA aircraft noise prediction program relating to circular jet noise. The earlier method agreed reasonably well with experimental static and flight data for jet velocities up to approximately 520 m/sec. The poorer agreement at higher jet velocities appeared to be due primarily to the manner in which supersonic convection effects were formulated. The purely empirical supersonic convection formulation is replaced in the present method by one based on theoretical considerations. Other improvements of an empirical nature were included based on model-jet/free-jet simulated-flight tests. The effects of nozzle size, jet velocity, jet temperature, and flight are included.

PAT-APPL-6-135 056 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, CA.
Electrical Servo Actuator Bracket.
Patent Application,
R. V. Sawyer. Filed 20 Feb 80, 10p N80-21327/5, NASA-CASE-FRC-11044-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A bracket for an electrical servo actuator is disclosed which was developed particularly for jet engine fuel control values. Said servo actuator is mounted on a support arm which is allowed to pivot on a bolt through a fixed mounting bracket. The actuator is pivotally connected to the end of the support arm by a bolt which has an extension that passes through a slot in the fixed mounting bracket. An actuator rod extends from the servo actuator to a crank arm which turns a control shaft. A short linear thrust of the rod pivots the crank arm through about 90 deg for full-on control with the rod contracted into the servo actuator, and full-off control when the rod is extended from the actuator.

PB80-182678 PC **A08**/MF **A01**
National Materials Advisory Board (NRC), Washington, DC.
Reliability of Ceramics for Heat Engine Applications.
Final rept.
1980, 152p NMAB-357
Contract MDA903-78-C-0038
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.

The potential for use of monolithic ceramics in heat engines presents an attractive possibility for significant improvement in engine durability, efficiency, and multi-fuel capability. Moreover, many ceramics possess hot-corrosion and oxidation resistance properties that are much superior to those of any metal alloy. However, certain problems are involved in using ceramics in engine applications which stem basically from the nonductile nature of these materials. This requires the use of very precise analyses and test techniques to assist the designer in applying ceramic load-bearing components in engines. While some such techniques and methodologies are now available, much more data are required on the reliability of ceramics for these applications. The problems which must be addressed to provide acceptable levels of reliability require further developments in design methodology, quality assurance, and testing procedures for their solution. Perhaps the most crucial problem is that of providing a system to maintain iterative test and development programs which integrate all of the above technology areas and assure effective feedback among them. Such problems and issues are discussed in this report, and recommendations for appropriate research and development programs are presented and documented.

PB80-810591 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cavitation: Cavitation Flow and Erosion in Turbines. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Guy E. Habercom, Jr. May 80, 99p
Supersedes NTIS/PS-79/0330 and NTIS/PS-78/0261.

The cavitation flow characteristics and erosion processes involving turbopumps, turbine blades, and stem turbines are documented. Steam, liquid, and drop flow are investigated. Test facilities and methods are described, as well as statistical and theoretical information. The applications include rocket engines, cryopumps, and other hydraulic turbines. (This updated bibliography contains 92 abstracts, 4 of which are new entries to the previous edition.)

21G. Reciprocating Engines

AD-A083 282/4 PC **A06**/MF **A01**
Teledyne Continental Motors Mobile AL Aircraft Products Div
MINI-RPV Engine Demonstrator Program.
Final rept. Feb 77-Mar 79,
Bernard J. Rezy. Mar 80, 102p USARTL-TR-79-23
Contract DAAJ02-77-C-0015

This report details the findings from a program to investigate a MINI-RPV propulsion system and to design, fabricate, test, and deliver a multicylinder, two-stroke technology demonstrative engine for Government evaluation. The work includes the development of three generations of engines: a basic feasibility engine, an engine incorporating a combined alternator-ignition system, and an engine incorporating an exhaust system and design improvements based on development testing of the previous engines. (Author)

N80-21465/3 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
Thermodynamic Analysis of Turbulent Combustion in a Spark Ignition Engine. Experimental Evidence.
G. P. Beretta, M. Rashidi, and J. C. Keck. 1980, 51p NASA-CR-162859, WSS-80-20
Grant NSG-3245
Presented at the Spring 1980 Meeting of the Western States Section, Irvine, Calif., 21-22 April 1980.

A method independent of physical modeling assumptions is presented to analyze high speed flame photography and cylinder pressure measurements from a transparent piston spark ignition research engine. The method involves defining characteristic quantities of the phenomena of flame propagation and combustion, and estimating their values from the experimental information. Using only the pressure information, the mass fraction curves are examined. An empirical burning law is presented which simulates such curves. Statistical data for the characteristics delay and burning angles which show that cycle to cycle fractional variations are of the same order of magnitude for both angles are discussed. The enflamed and burnt mass fractions are compared as are the rates of entrainment and burning.

21H. Rocket Motors and Engines

AD-A083 464/8 Not available NTIS
Defence Research Establishment Valcartier (Quebec)
Nonlinear Combustion Instability in a Solid Propellant Two-Dimensional Window Motor,
Patrick M. Hughes, and A. Jaan Saber. 1978, 7p DRB-REPRINT-4213
Prepared in cooperation with Concordia Univ., Montreal (Quebec). Dept. of Mechanical Engineering.
Availability: Pub. in Proceedings of AIAA/SAE Joint Propulsion Conference (14th), Las Vegas, Nev./July 25-27, 1978, p1-6 (No copies furnished by DTIC/NTIS).

No abstract available.

22. SPACE TECHNOLOGY

22A. Astronautics

AD-A083 476/2 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Comparison between the 30-to 80-keV Electron Channels on ATS 6 and 1976-059A during Conjunction and Application to Spacecraft Charging Prediction,
H. B. Garrett, D. C. Schwank, P. R. Higbie, and D. N. Baker. 25 Jul 79, 10p Rept no. AFGL-TR-80-0124
Pub. in Jnl. of Geophysical Research, v85 nA3 p1155-1162, Mar 80.

No abstract available.

AD-A083 536/3 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB Oh
Aeronautical Knowledge (Selected Articles).
5 Jul 79, 27p Rept no. FTD-ID(RS)T-0360-79
Edited trans. of Hang K'ung Chih Shih (China) n9 p16-21 Sep 78.

No abstract available.

AD-A083 543/9 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Anniversaries and Prospects.
25 Apr 79, 8p Rept no. FTD-ID(RS)T-0578-79
Edited trans. of Astronautyka (Poland) n2 p1-2 1977, by John Hanus.

No abstract available.

N80-21382/0 PC **A07**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronics and Space Systems.
LEGO: Definition Study of Potential Operation Modes for Large Spacelab Facility Payloads (LIRTS, EXSPOS, GRIST).
Final Report.
R. A. Henderson. Jul 79, 148p ESS/SS-947, ESA-CR(P)-1262
Contract ESA-3721/78-F-HEW(SC)

Feasible alternative mission operation modes with respect to minimizing mission costs were investigated for three large solar/astronomy instruments. Different mission modes are identified, consequences for operation, instruments design and development, and relative budgetary costs are presented and optimum mission modes are selected. A systems requirement is outlined and subsystem hardware identified to support the mission mode. Development plans and budgetary costs for the three instruments/missions modes are given.

N80-21383/8 PC **A03**/MF **A01**
European Space Agency, Paris (France).
EISCAT-SAT: Assessment Study.
Oct 79, 40p ESA-SCI(79)2

The EISCAT-SAT space mission intended to operate in conjunction with the European Incoherent Scatter (EISCAT) facility and other high latitude ground based remote sensing facilities in Northern Europe is described. The current knowledge and understanding of high latitude magnetospheric dynamics are reviewed. An appropriate model payload is described, and suitable spacecraft orbits are discussed. The region of prime interest is located on auroral field lines at altitudes of between 1 and 3 Earth radii. Orbits with inclinations in the range 63 deg to 90 deg, perigee altitudes 200 to 500 km and apogee altitudes up to 3 Earth radii are considered. It is shown that the expected results will contribute to a wide variety of geophysical studies. An assessment of orbit injection and maintenance requirements is presented, based on the use of the Ariane Launch vehicle, but with some consideration given to use of Space Transportation System. It is shown that a bipropellant motor with multirestart capability is required, and it is suggested that a modification of the Symphonie motor design would be suitable.

N80-21384/6 PC **A04**/MF **A01**
European Space Operations Center, Darmstadt (Germany, F.R.).
Mission Analysis for Terrestrial Satellites and Planetary Orbiters: Software Design and Algorithm Description.
G. Janin. Aug 79, 51p ESA-STM-208

A mission analysis software system specifically designed to be used in a cost effectiveness environment is described. The system makes it possible to perform fast and accurate studies with low manpower and computing power. It is shown that the resulting software system, the unified system for orbit computation is flexible and efficient for mission analysis of all current ESA projects and for instaneous emergency mission planning.

N80-21386/1 PC **A03**/MF **A01**
European Space Operations Center, Darmstadt (Germany, F.R.).
Geos Rescue: Mission Planning and Implementation in Near-Real Time.
E. A. Roth. Oct 79, 28p ESA-STR-204

The background events leading to the rescue of the GEOS mission after the launcher failure which put the spacecraft in a highly anomalous transfer orbit are presented. This failure made it impossible to attain the desired geostationary orbit. Mission analysis under extreme time pressure permitted the elements for a decision on the selection of a rescue orbit to be prepared. Parallel activities, all performed under difficult conditions, were orbit and attitude determination and the preparation of the implementation plan for the apogee motor firing. The many problems encountered and the constraints which had to be considered are recalled. Less than five days after launch and shortly before the continuous loss of power became critical, the satellite was injected into a safe 12 hour orbit providing an optimal scientific return.

N80-21392/9 PC **A17**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Skylab Reactivation Mission Report.
W. B. Chubb. Mar 80, 387p NASA-TM-78267

On July 11, 1979, Skylab impacted the Earth's surface. The debris dispersion area stretched from the South Eastern Indian Ocean across a sparsely populated section of Western Australia. The events leading to the reentry of Skylab are discussed and a final assessment of the Skylab debris impact footprint is presented. Also included are detailed evaluations of the various Skylab systems that were reactivated when control of Skylab was regained in mid-1978 after having been powered down since February 4, 1974.

N80-21394/5 PC **A10**/MF **A01**
Contraves Corp., Zurich (Switzerland). Space Dept.
Study on Large, Ultra-Light, Long-Life Structures in Space: Phase 1.
Final Report.
M. C. Bernasconi. Jul 79, 220p ESA-CR(P)-1258
Contract ESTEC-3445/77-NL-PP(SC)

An overview of the concept of large space structures and their possible uses is presented. A large reflector antenna is described and its possible fields of application are summarized. Specifications for the reflector antenna including a performance definition, mission scope, and operational requirements are presented. A number of design concepts for the antenna are analyzed. Among these are a single mesh antenna, a tension wire antenna, and Balloon antenna.

N80-21396/0 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Scientific Experiments on the Flight of the 1979 Biological Satellite, Draft Plan.
Jan 79, 62p NASA-TM-76017
Contract NASW-3199
Transl. Into English of Draft Plan "Nauchnyye Eksperimenty V Polete Biologische Sputnika" Moscow, 1979 63 p. Translation Was Announced as N78-11171. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Inst. Of Med. And Biol. Probl., USSR Min. Of Health and Intercosmos Council, Acad. Of Sci., USSR.

The various physiological, biological, radiobiological, and radiation physics experiments to be conducted onboard the 1979 biological satellite are described. These experiments deal with the effects of space flight on living organisms, measurement of radiation, and possible methods of shielding spacecraft against such radiation.

N80-21962/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Investigation of the Effect of Space Flight Factors on Chromosomes in Seeds.
L. G. Dubinina. Mar 80, 4p NASA-TM-76113
Contract NASW-3198
Transl. Into English from the Book "Issledovaniya Deystviya Faktorov Kosmicheskogo Poleta NA Khromosomy I Semenakh" Moscow, Nauka Press, 1978 p 106-107. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Frequency of mutations in postflight air-dry Crepis capillaris seeds, kept for five days aboard an artificial satellite was 36.0 + or - 1.9%, vs. 19.01 + or - 1.2% for seeds in a similar ground experiment. Both groups of seeds were prepared in identical concentrations and were treated by the same mutagen. The spectrum of mutations in postflight Crepis capillaris seeds contained a large number of chromosome-type mutations and some cells showed multiple alterations. Postflight seeds not treated with mutagens had a slightly higher level of mutability.

N80-22200/3 PC **A08**/MF **A01**
European Space Agency, Paris (France).
Comet Halley Micrometeoroid Hazard Workshop.
N. Longdon. Oct 79, 151p ESA-SP-153
Presented at Esa Intern. Workshop, Noordwijk, Neth., 18-19 Apr. 1979.

No abstract available.

N80-22220/1 PC **A03**/MF **A01**
European Space Agency, Paris (France).
Asteroid Exploration Mission (ASTEREX). An Assessment Study.
Oct 79, 42p ESA-SCI(79)1

The Asteroid Exploration (ASTEREX) mission is discussed. A spacecraft is placed in a carefully chosen orbit about the Sun (perihelion about 1 AU; aphelion about 3.5 AU) which takes it through the asteroid belt. A conventional propulsion system is used to correct the trajectory and to enable four or more asteroids to be approached within about 1,000 km. Specific scientific objectives to be addressed by the ASTEREX mission include: cratering, surface morphology, geology, mineralogy, shape, spin, size, density, close environment, and magnetism. It is concluded that it is essential to include in the payload a versatile imaging system and a radar altimeter. High priority is given to the inclusion of a magnetometer and an infrared spectrometer. The results of a limited statistical analysis of launch opportunities in 1986 are presented. It is shown that missions including 3 and 4 asteroid fly-bys can be acheived by means of an Ariane launcher equipped with a fourth stage. A number of spacecraft configurations are presented. The preferred option is a 3-axis stabilized spacecraft.

22B. Spacecraft

AD-A083 136/2 PC **A04**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
The Precipitating Electron Detectors (SSJ/3) for the Block 5D/Flights 2-5 DMSP Satellites: Calibration and Data Presentation.
Instrumentation papers,
D. A. Hardy, M. S. Gussenhoven, and A. Huber.
14 Sep 79, 52p Rept nos. AFGL-TR-79-0210, AFGL-IP-262

In addition to weather monitoring devices, the Defense Meteorological Satellite Program satellites currently have on-board auroral imaging devices, precipitating electron detectors, and thermal plasma analyzers. Together these provide a strong tool for analyzing the high latitude, near earth, magnetospheric environment. The program is planned to continue into the 1980s. The precipitating electrons are measured in 16 energy channels spanning an energy of 50 eV to 20 keV. The data have the potential of providing real-time monitoring of auroral activity through oval boundary measurements. To facilitate the use of these data and to examine the feasibility of making consistent, reliable boundary measurements, this report has been prepared. It contains the following: a general description of the DMSP-F2 orbit, its variations in universal time and season, and the pertinence of these variations to boundary measurements, a description of the SSJ/3 pakcage, one of which is built for each of four DMSP satellites and the results of calibrating two of the instruments; a discussion of the way data is processed; a comparison of Northpole-Southpole passes during a magnetospherically quiet period and during an active period, and a discussion of the general features of the electron precipitation as they may be used to determine auroral boundaries.

AD-A083 142/0 PC **A06**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Heat-Transfer Tests of the NASA/Rockwell International Space Shuttle Orbiter (OH-84B), IH-102, and OH-105).
Final rept.,
K. W. Nutt, G. L. Dommerman, and A. C. Mansfield. Aug 79, 109p Rept no. AEDC-TSR-79-V42
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Heat transfer tests were conducted on two 0.0175 scale and one 0.04 scale models of the space shuttle orbiter using the thin-skin thermocouple technique. Data were recorded at Mach numbers 3 and 4 in the AEDC-VKF Supersonic Wind Tunnel A and at Mach 8 in the Hypersonic Tunnel B. Ten model configurations were tested including each orbiter model and the two 0.0175 scale models integrated with the external tank and both solid rocket boosters. The objective of the test was to obtain heating data in regions of the orbiter where no previous data exist or where data extrapolation was not feasible. The model angle of attack ranged from -40 to 40 degrees with yaw angles varying from -15 to 10 degrees. (Author)

AD-A083 362/4 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
'East is Red Number 1' A Manmade Earth Satellite.
1 Jun 79, 6p Rept no. FTD-ID(RS)T-0727-79

Edited trans. of Hang K'ung Chih Shih (China) n3 p3 1978, by H. P. Lee.

No abstract available.

N80-21280/6 PC **A03/MF A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Comparison of Predicted and Experimental Real-Gas Pressure Distributions on Space Shuttle Orbiter Nose for Shuttle Entry Air Data System.
J. L. Shinn. Apr 80, 29p NASA-TP-1627, L-13341

An experimental investigation of inviscid real-gas effects on the pressure distribution along the Space Shuttle Orbiter nose center line up to an angle of attack of 32 deg was performed in support of the Shuttle Entry Air Data System (SEADS). Free-stream velocities from 4.8 to 6.6 km/s were generated at hypersonic conditions with helium, air, and CO2, resulting in normal-shock density ratios from 3.7 to 18.4. The experimental results for pressure distribution agreed closely with numerical results. Modified Newtonian theory deviates from both experiment and the numerical results as angle of attack increases or shock density ratio decreases. An evaluation of the use of modified Newtonian theory for predicting SEADS pressure distributions in actual flight conditions was made through comparison with numerical predictions.

N80-21281/4 PC **A99/MF A01**
Lockheed Missiles and Space Co., Huntsville, AL.
Results of Two Tests in the Msfc 14 by 14-Inch Trisonic Wind Tunnel, FA 27 (Twt-655) and FA 28 (Twt-656).
Final Report.
W. F. Braddock. Dec 79, 884p NASA-CR-161427, LMSC-HREC-TR-D697767
Contract NAS8-32530

Wind tunnel tests were conducted in a 14- inch wind tunnel with a 0.004 scale model of the space shuttle launch vehicle in order to (1) determine the cause and possible aerodynamic alterations required to eliminate the Orbiter rolling moment couple; (2) determine configuration alterations to alleviate the forward Orbiter external tank loads; and (3) provide data to verify previous data.

N80-21317/6 PC **A05/MF A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Simulator Study of the Effect of Control-System Time Delays on the Occurrence of Pilot-Induced Oscillations and on Pilot Tracking Performance with a Space-Shuttle-Orbiter Configuration.
D. R. Riley, and G. K. Miller, Jr. Apr 80, 91p NASA-TP-1588, L-13131

Using a six degree-of-freedom motion-base simulator, the effect of control-system time delays on the occurrence of pilot-induced oscillations (PIO's) on the vehicle handling qualities and on pilot tracking performance for a landing-approach configuration of the Space Shuttle orbiter was studied. A linearized math model was employed which represented a 300-knot orbiter with almost all time delays removed. Additional time delays were then inserted following the pilot's hand-controller signals. Only pitch and roll commands were used for vehicle control. The simulation employed an air to air tracking task as a means of emphasizing PIO tendencies. Two astronauts, two research pilots, and one simulation engineer served as test subjects. Results showed that PIO's occurred when the amount of added time delay approximated that existing for the orbiter configuration flown in the approach and landing tests. Increasing the amount of delay increased PIO occurrences and resulted in degraded tracking performance. Decreasing the amount of time delay eliminated the PIO's.

N80-21336/6 PC **A02/MF A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Dynamics Stability Derivatives of Space Shuttle Orbiter Obtained from Wind-Tunnel and Approach and Landing Flight Tests.
D. C. Freeman, Jr. Apr 80, 20p NASA-TP-1634, L-13427

A comparison was made between ground facility measurements, the aerodynamic design data book values, and the dynamic damping derivatives extracted from the space shuttle orbiter approach and landing flight tests. The comparison covers an angle of attack range from 2 deg to 10 deg at subsonic Mach numbers. The parameters of pitch, yaw, and roll damping, as well as the yawing moment due to rolling velocity and rolling moment due to yawing velocity are compared.

N80-21355/6 PC **A03/MF A01**
National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, CA.
Design of a Nonlinear Adaptive Filter for Suppression of Shuttle Pilot-Induced Oscillation Tendencies.
J. W. Smith, and J. W. Edwards. Apr 80, 31p NASA-TM-81349, H-1119

Analysis of a longitudinal pilot-induced oscillation (PIO) experienced just prior to touchdown on the final flight of the space shuttle's approach landing tests indicated that the source of the problem was a combination of poor basic handling qualities aggravated by time delays through the digital flight control computer and rate limiting of the elevator actuators due to high pilot gain. A nonlinear PIO suppression (PIOS) filter was designed and developed to alleviate the vehicle's PIO tendencies by reducing the gain in the command path. From analytical and simulator studies it was shown that the PIOS filter, in an adaptive fashion, can attenuate the command path gain without adding phase lag to the system. With the pitch attitude loop of a simulated shuttle model closed, the PIOS filter increased the gain margin by a factor of about two.

N80-21385/3 PC **A06/MF A01**
Engins Matra, Velizy (France).
Definition Study of Potential Operational Modes for Large Spacelab Facility Payloads.
D. Kaplan. 1979, 115p REPT-60/859, ESA-CR(P)-1285
Contract ESTEC-3785/78-F-HEW

A study of possible design trade-offs for the large infrared telescope for skylab (LIRTS) was made with respect to such proposed mission configurations as LIRTS extended duration mission, power module supported mission, and autonomous free flying mode. The free flying mode was examined in detail regarding the minimum support structure, a deployable secondary mirror, and the requirement for larger liquid helium cryostats. Some rough order of magnitude of cost assessments were made in relation to modification of the focal plane instrument package and the manufacture of larger size cryostats taking the current ESTEC dewar cost for reference.

N80-21408/3 PC **A02/MF A01**
Rocketdyne, Canoga Park, CA.
Orbital Transfer Vehicle (Otv) Engine Study Phase A, Extension.
A. J. Sobin. 11 Mar 80, 14p NASA-CR-161416, BMPR-4
Contract NAS8-32996

The current Phase A-Extension of the OTV engine study program seeks to provide additional expander and staged combustion cycle data that will lead to design definition of the OTV engine. The proposed program effort will optimize the expander cycle engine concept (consistent with indentified OTV engine requirements), investigate the feasibility of kitting the stage combustion cycle engine to provide extended low thrust operation, and conduct in-depth analysis of development risk, crew safety, and reliability for both cycles. Additional task will address costing of a 10k thrust expander cycle engine and support of OTV systems study contractors.

N80-21409/1 PC **A06/MF A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
A Study of the Effect on a Typical Orbiter Payload Thermal Environment Resulting from Specular Reflections from the Forward Orbiter Radiators.
R. Humphries, L. Turner, and J. W. Littles. Mar 79, 107p NASA-TM-78270

The orbiter radiator external coating is highly specular silverized Teflon. Solar energy specularly reflected from these radiators on a typical payload which, when deployed, extends above the payload bay envelope was studied. The flux levels are compared assuming both diffuse and specular radiators.

N80-21410/9 PC **A05/MF A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (Germany, F.R.). Space Div.
Pallet Type Structure for Different Space Transportation System (STS) Mission Modes as Used for Shuttle Pallet Satellites (SPAS).
Final Report.
Jul 79, 87p MBB-R3700/2137-R, ESA-CR(P)-1267
Contract ESA-3790/78-F-FC(SC)
Original Contains Color Illustrations.

The application of a modular payload support structure (MPSS) was analyzed for different Spacelab payloads. It was demonstrated that with a basis inventory of MPSS structure elements, sufficient flexibility can be achieved to support the envisaged range of space transformation system (STS) payloads. The MPSS structure is used as a carrier for the shuttle pallet satellite (SPAS). It utilizes a construction principle that satisfies future payload requirements at small structure cost compared with the total project cost. The performance characteristics of MPSS and its development status is given. A potential MPSS inventory is proposed and costed.

N80-21411/7 PC **A06/MF A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F. R.).
Study of Pallet-Type Structures and Supporting Subsystems for Different Space Transportation System (Sts)/Spacelab Mission Modes.
Executive Summary Report.
H. T. Uebelhack, and W. Pritzer. Aug 79, 119p ESA-CR(P)-1274
Contract ESA-3756/78-F-HEW(SC)

The structural support required for various future experimental STMS payloads is defined and their required subsystem support is identified. The three different mission modes considered include the STS sortie mode the power module supported mode, and the free flying mode. A number of experiments and payloads were investigated with respect to their subsystems and structural requirements. Three structural modular concepts were defined and measured against the payload requirements. One structural concept called the panel structure was found to be most favorable with respect to flexibility in accepting payloads. Three payloads were further studied in order to define structural elements and the required subsystem support. Cost estimates were performed for the development/manufacturing programs of the structures and for a limited program of STS missions in the three different modes.

N80-21413/3 PC **A09/MF A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Interplanetary Monitoring Platform Engineering History and Achievements.
P. M. Butler. May 80, 179p NASA-TM-80758

In the fall of 1979, last of ten Interplanetary Monitoring Platform Satellite (IMP) missions ended a ten year series of flights dedicated to obtaining new knowledge of the radiation effects in outer space and of solar phenomena during a period of maximum solar flare activity. The technological achievements and scientific accomplishments from the IMP program are described.

N80-21414/1 PC **A08/MF A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Study of the Application of the Infrared (IR) Test Technology to the ESA/ISPM Spacecraft.
Final Report.
A. Braig, and G. Lorch. 20 Jul 79, 152p DS-ERT-13-79, ESA-CR(P)-1247
Contract ESA-3839/79-NL-HP(SC)

The investigation of the ESA International Solar Polar Mission (ISPM) spacecraft configuration and

thermal environment regarding IR testing is described. Critical sub-units are identified and a test plan for the system thermal balance and thermal vacuum tests is established. The possible infrared IR test techniques are investigated and an optimized IR approach is selected. The method chosen is the skin heater technique in combination with the plate heater technique for the experiment apertures. The interfaces of existing test chambers are identified and a proper chamber is selected for ISPM IR testing. The layout of the IR heater system and the power supply system is discussed and performed skin heater feasibility tests are described. A critical comparison between the solar simulation approach and the IR approach regarding test costs, possible test errors and test hazards is performed and the consequences for the mathematical model are investigated.

N80-21415/8 PC **A04/MF A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Study on Pointing Mounts for the Spacelab Mission DM2.
Final Report.
B. Doll, C. Etzler, K. Ernsberger, and R. Gunzenhauser. May 79, 67p ESA-CR(P)-1249
Contract ESA-3829/79-D-HEW(SC)

The technical effects required to define the Demonstration Mission 2 (DM2) mission pointing tasks were investigated, to include an analysis of transport and provider costs. Various combinations of pointer and experiment are presented. The cost figures reveal that a reduction of the number, the mass and the diversified pointing requirements increases the preference for specially dedicated pointing systems besides IPS. The three cluster configuration seems to be the break even point of preference, when only one flight application is considered. When two flights are considered, if one of the pointing mounts can be reused in another mission, or when the number and pointing requirements of the experiments are sensitively reduced, as considered above, the combination of ONAPS and one or two DM2 Pointers is the most economic way to resolve the pointing problem.

N80-21416/6 PC **A07/MF A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Small Positioning and Hold Mount for Spacelab Experiments.
Final Report.
H. Meir, K. Priesett, H. M. Hell, and E. Wedel. Jun 79, 143p ESA-CR(P)-1265
Contract ESTEC-3674/78-NL-AC(SC)

A number of low mass Spacelab experiments were identified that require pointing in different directions but can rely on the orbiter attitude stability and accuracy. A payload capacity of 100 to 160 kg and a positioning accuracy of 0.1 degree with respect to the orbiter is considered to satisfy the accomodation and operational requirements of these experiments in an economic way. Based on existing and qualified hardware, a modular PHM-concept is presented that consists of bearing and drive assemblies, power electronics processor controlled data electronics, and a locking mechanism. The adaption to special payload requirements and mounting locations within Spacelab will be achieved by adding of structural components designed to the specific mission requirements. The design of the drive units and the digital attitude control by a processor allows an increase in the performance of the mount using additional attitude sensors and ensures flexibility and adaptability.

N80-21417/4 PC **A02/MF A01**
National Aerospace Lab., Amsterdam (Netherlands). Space Flight Div.
Accurate Spacecraft Attitude Estimation with the Esa Starmapper.
P. T. L. M. Vanwoerkom, and C. R. Traas. 15 Sep 79, 9p NLR-MP-78037-U
Presented at 8TH Ifac Symp. On Autom. Control in Space, Oxford, 2-6 Jul. 1979.

The design of a starmapper, an optical-electronic instrument with an array of photosensitive slits which are strapped to the spinning spacecraft is described. Recorded times of the passage of known stars over the slits, together with mathematical models of the spacecraft dynamics and starmapper instrument provide the basis for recursive estimation of the spacecraft attitude. The models are described and the attitude estimation approach is discussed.

N80-21418/2 PC **A08/MF A01**
Saab-Scania, Linkoping (Sweden). Aerospace Div.
Positioning and Hold Mount (Phm) for Spacelab Experiments. Phase 1: Hardware Technology Study.
Final Report.
J. Andersson, R. Persson, B. Mortberg, H. Svensson, and A. Arodell. Jun 79, 163p ESA-CR(P)-1275
Contract ESA-3673/78-NL-AK(SC)

Positioning and hold mount (PHM) is a pointing system which is stabilized with respect to the orbiter frame but not inertially. Its pointing maneuvers are defined by electrical command signals from the Spacelab CDMS experiment computer. Experiments compatible with the proposed PHM design were identified, along with necessary design modifications to existing hardware. A conceptual PHM design was studied and the PHM development cost estimated. Performance and user costs for a few different pointing systems (e.g., PHM, SEM, IPS) were compared. A PHM design is proposed based upon existing hardware which features low total user cost and development cost, high payload mass/size capability and accomodation flexibility (max 250 kg), high performance with respect to the requirements (more than hemispherical coverage; high inherent accuracy) high safety, simple handling and operation suitable for improved (stabilized) versions and low development risk.

N80-21717/7 PC **A14/MF A01**
Aeritalia S.p.A., Turin (Italy).
Survey of Fluid Loop Components: Radiator Control Unit.
Final Report.
L. Bussolino. Jun 79, 322p R-TC-79-TR-0005, ESA-CR(P)-1261
Contract ESA-3661/78-NL-PP(SC)

The detail assessment, trade-offs and supporting discussion that demonstrates the preference for simple bypass control for a Spacelab radiator and for an experiment dedicated radiator system is presented. The thermal control of the radiator is a critical item to ensure both the reliability of the radiator loop and the thermal compatibility with the Spacelab control loops. The thermal performance assessment and trade-offs regarding bypass and regenerative heat exchanger types of radiator control are described. Component descriptions, Spacelab interfaces, and the programmatic aspects of a radiator control unit including a development plan for bypass and regenerative heat exchanger types of control are presented.

N80-21796/1 PC **A02/MF A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (Germany, F.R.). Inst. for Aeroelasticity.
Development of Modal Techniques Using Experimental Modal Data. End of Phase 2 Report.
A. Bertram. 20 Feb 79, 20p DLR-IB-253-79/C/09, ESA-CR(P)-1256
Contract ESTEC-2998/76-NL-PP(SC)

Work performed during the development of three software packages for use in modal analysis is outlined, and the programs described. Program DIMOC is used for calculating the effect of small structural modifications, MODAS for modal coupling analyses, and RESPON for dynamic response analyses of a satellite coupled to a launcher.

N80-22052/8 PC **A09/MF A01**
British Aerospace Aircraft Group, Bristol (England).
Spacecraft Structural Acoustic Studies: The Development of a Practical Prediction Technique for Noise Induced Structural Vibration and Sound Transmission.
Final Report.
R. J. Cummins, and W. Cooper. Jun 79, 200p ESA/B44-7/0712, ESA-CR(P)-1264
Contract ESA-3343/77-NL-PP(SC)

A prediction method was developed for noise induced structural vibration and sound transmission based on the concepts of statistical energy analysis (SEA). A general statistical energy program, GENSTEP, was written in FORTRAN ANS language which is capable of solving problems modelled by the SEA techniques. An experimental program was also performed in order to establish necessary SEA parameters for a range of typical spacecraft structural components. The computer predictions show a good agreement with the measured response of simple structures exposed to broad band reverberant noise. The limitations of the current method are defined together with suggestions for future development.

PATENT-4 193 570 Not available NTIS
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Active Nutation Controller.
Patent.
H. C. Hoffman, and J. H. Donohue. Filed 19 Apr 78, patented 18 Mar 80, 11p N80-21719/3, PAT-APPL-897 830
Supersedes PAT-APPL-897 830-78, N78-23141 (16 - 14, p 1813).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An apparatus is described for controlling nutation motion in a spinning body, comprised of an angular accelerometer with its input axis perpendicular to the spin axis of the body, a flywheel with an axis of rotation perpendicular to the axis of the accelerometer and to the spin axis of the body, and a motor for driving the flywheel to attenuate or build nutation. The motor is controlled by circuitry that monitors the output of the angular accelerometer and drives the motor clockwise or counterclockwise during predetermined nutation angles synchronized to the zero crossover points of the accelerometer signal centered about the nutation peaks. The motor drive is phased to damp nutation motion to zero for stabilization. To increase the noise immunity of the system, when the output of the accelerometer falls below a threshold level, the circuitry operates in an open loop, beat mode where data representing the last accelerometer signal that exceeded that threshold level is stored, and the motor drive is controlled by the stored data. In a second version, the motor is controlled to supply a predetermined amount of nutation motion to a body undergoing testing on a spin table for energy dissipation evaluation. In each version, the use of an angular accelerometer rather than a linear accelerometer or gyro to monitor nutation enables placement of the nutation control apparatus at any location relative to the spin axis of the body requiring only crude orientation and no calibration.

22C. Spacecraft Trajectories and Reentry

AD-A083 231/1 PC **A03/MF A01**
Aerospace Corp El Segundo CA Engineering Group
An Analytical Integration of the Averaged Equations of Variation due to Sun-Moon Perturbations and its Application.
Final rept. Oct 78-Mar 79,
C. C. Chao. Oct 79, 46p TR-0080(5473-03)-1, SD-TR-80-12
Contract F04701-79-C-0080

The perturbed variations of the motion of earth satellites due to the sun and the moon are derived from a singly averaged disturbing function. A first-order solution is obtained by analytically integrating the equations of variation including J2, J2-squared, J3, and J4. The literal expansions are carried out by computer in terms of classical elements. The secular part of the first-order solution is included in the reference orbit. The orbits of the sun and the moon are assumed circular, and the motion of the moon is converted to the earth equatorial system with certain approximations. Results based on the GPS (Global Positioning System) satellites compare favorably with numerical integration for time spans of up to three years. An algorithm applying the first-order solution has been developed to achieve the desired strategy of orbit maintenance for the GPS Phase III system. The analytical solutions provide insight into the long-term (10-yr) variations of the orbit elements of GPS satellites. (Author)

AD-A083 363/2 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
An Amateur Satellite Tracking Team (in the PRC).
Zhi Wang. 11 Jul 79, 14p Rept no. FTD-ID(RS)T-0792-79
Edited trans. of Hang K'ung Chih Shih (China) n1 p24-26 Jan 79.

No abstract available.

N80-21387/9 PC **A05**/MF **A01**
TRW Defense and Space Systems Group, Houston, TX. Systems Engineering and Analysis Dept.
OPS Bench Navigation Program User's Manual.
T. H. Wannamaker. 8 Jan 80, 86p NASA-CR-160560, REPT-34538-H002-R0-00
Contract NAS9-15722

Operational information is detailed for a single-vehicle weighted least squares orbit determination program with the capability of generating and storing emphemerides for three tracking Data Relay Satellites. The tape and card inputs and input format, input tape unit assignments, a program deck setup for a program run, and sample cases illustrating the output of typical runs are described.

N80-21397/8 PC **A14**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Viking Navigation.
W. J. Oneil, R. P. Rudd, D. L. Farless, C. E. Hildebrand, and R. T. Mitchell. 15 Nov 79, 322p NASA-CR-162917, JPL-PUB-78-38
Contract NAS7-100

No abstract available.

N80-21953/8 PC **A02**/MF **A01**
Engineering Analysis, Inc., Huntsville, AL.
Verification of Interim Simulated Atmospheric Turbulence.
Final Report.
F. B. Tatom, and S. R. Smith. 10 Mar 80, 24p NASA-CR-161432, EAI-TR-80-001
Contract NAS8-33714

During horizontal and near-horizontal flight of the space shuttle orbiter, the effects of atmospheric turbulence on the vehicle are crucial in establishing the space shuttle design, control, and human pilot effects. The effects of both turbulent gusts and gust gradients (shears) must be taken into account. By means of a nonrecursive turbulence simulation model, twelve simulated turbulence time series for gusts and gust gradients were generated as part of a previous investigation. The current investigation was concerned with the spectral analysis of the time series based on the use of Fourier transform theory. A comparison between the computed spectra and the corresponding von Karman theoretical spectra is also included. A basic difference is explained between the computed and theoretical spectra which was identified as a result of the comparison. Conclusions and recommendations are presented.

22D. Spacecraft Launch Vehicles and Ground Support

N80-21362/2 PC **A08**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
The Deep Space Network.
Progress Report, Jan. - Feb. 1980.
15 Apr 80, 154p NASA-CR-162857, JPL-PR-42-56
Contract NAS7-100

No abstract available.

N80-21393/7 PC **A09**/MF **A01**
Institute for Industrial Research and Standards, Dublin (Ireland). AMC Dept.
Ground Support Test Equipment Rack.
P. A. Kelleher, T. D. Gaffney, B. A. Coghlan, and T. P. Oconnor. Jul 79, 200p ESA-CR(P)-1257
Contracts ESA-3428/77-NL-HP(SC), IIRS-C15(78/8)-71103

A computer-controlled ground support equipment rack for carrying out the complete routine test procedures on the units of a spacecraft power subsystem was defined and specified. The general system configuration was determined, standard instrumentation being selected where feasible. Selection criteria included, ease of programming, cost effectiveness, single vendor, service availability. Each unit of the system was then defined in detail and custom units, including a ten-module programmable load panel, were designed, breadboarded and tested. A comprehensive software package was developed which makes the system easy to program for engineers. An overview of the complete system covering description, capabilities, advantages and costs is provided.

N80-21661/7 PC **A08**/MF **A01**
Analytical and Computational Mathematics, Zurich (Switzerland).
Fluctuating Ionospheric Index Influence on VHF Tracking and Online: Study on Merits and Limitations of Online Calibration Techniques for VHF Tracking.
P. Kohler. Oct 79, 151p ESA-CR(P)-1279
Contract ESOC-3495/78-D-JS(SC)

Path length and phase perturbations of pulsed and continuous wave signals propagating through random dispersive media are examined theoretically. The main emphasis is on transionospheric VHF tracking applications. Bias terms and noise uncertainity of real time correction for the additional ionospheric delay are given. Multifrequency correction is shown to be affected by an inherently high noise level which is due to discrete approximation of the phase differentiation and the technically limited detection accuracy. A higher order, e.g., five frequency scheme is proposed. The lower power per channel is compensated under quiet conditions and high tracking elevation. This procedure yields potentially to a higher accuracy.

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